The Builder.

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Presentation of Royal Gold Medal at the Institute of Architects.

ON Monday evening last the concluding ordinary general meeting of the Institute, for session 1875-76, was held at Conduit-street, Mr. Charles Barry, president, in the chair. There was a very crowded attendance, the occasion being at once the closing meeting of the session and the opening meeting of the fourth General Conference of Architects. Visitors attending the Conference were received by the President in the library from half-past seven to eight o'clock p.m.

Professor F. Meldahl, president of the Royal Academy of Copenhagen, and Professor Alexander Resanoff, rector of the School of Architecture in the Imperial Academy of Russia, were by acclamation elected honorary fellows of the Institute.

The following gentlemen were balloted for and duly elected, viz.,—As fellows: Mr. G. A. Audsley and Mr. W. J. Audsley, of Liverpool; and Mr. Ralph Nevill, F.S.A., of Godalming. As associates: Messrs. W. R. Bryden, Clapham; A. A. Griffiths Colpoys, St. Leonard's-on-Sea; W. Crisp, Holloway; R. M. Fulford, Exeter; W. Frame, Tongwynlais, near Cardiff; H. R. Perry, Derby; E. Seward, Cardiff; and A. J. Style, Thames Ditton.

The President,—who on rising to present the Royal Gold Medal to M. Joseph Louis Duc, Commander of the Legion of Honour, Member of the Institute of France, and Honorary and Corresponding Member of the Royal Institute of British Architects, was warmly applauded,—said:—

"MONS. DUC AND HONOURED COLLEAGUE,—As President of this Institute it becomes my duty to address you a few words, and I would in the outset bid you a hearty welcome to England, and rejoice with you in the special object which brings you among us.

There has been happily a brotherhood of artists in all ages, even when countries were practically divided from each other. Freemasonry did a useful and encouraging work in this respect, and it would be indeed a reproach to us if now, with ready means of communicating thought, and with further easy means of personal communication, that such brotherhood and sympathy one with another were not largely increased. Amid the vicissitudes of an artist's life, and his many anxieties, the knowledge that there is this sympathy supports him in his trouble and animates him to exertion, and our struggling, talented brother feels that he is one of ourselves. The great dead, too, are still with us, labouring, as it were, with us, and giving us examples and encouragement.

As, indeed, the laws of beauty, by which real art can alone be judged, have existed unchangeably, and will, doubtless, ever be the same among cultivated minds and tastes educated and trained to understand and apply them, so may this unity of thought knit together the artists of this and future ages, not only as artists, but with the even warmer personal sympathy which our human nature so much longs for.

Sir, it is my duty, and also my pleasure, to be the medium of conveying to you a distinguished honour on the present occasion, and it is an honour which I believe to be nearly unique in its character. It is conferred directly by the Sovereign, the fountain of all honour, but it is so conferred on the advice and with the good wishes of your equals and rivals in art in this country. Although the Royal Gold Medal is placed unreservedly at the disposal annually of the Royal Institute of British Architects, and although it is the summit of the ambition of all of us here to deserve and receive it, the architects of England, worthily represented by this Institute, animated, I rejoice to think, by the sentiments I have attempted to express, have decided that every third year at least they will look abroad, and by recommending her Majesty to bestow it on a foreigner, show the desire to know and be known, to honour and be honoured, by those who, strangers to them in country and language, are yet their dear brethren in art as embodied in our noble profession.

Your title to this distinction, M. Duc, needs no description from me, yet it is a pleasure to all of us to remember that among our honoured ones is the distinguished architect of the graceful Column on the Place de la Bastille, and who has directed and restored the buildings of the Palais de Justice. And we remember also the talent of the man who could carry off the Grand Prix de Rome in 1825; the great prize, of several thousand pounds, given (in 1869) by the late Emperor; and whose unselfish love for his art prompted him to devote half of the sum before mentioned as prizes of encouragement to young architects.

This medal of honour was established by our Sovereign in the year 1848, and I think, sir, it will perhaps enhance the feeling with which you receive it to find yourself one among the little band whose honoured names have been made known to you, many of whom have passed away and live only in our memories and esteem; while of the others who are still among us, all whom absence or illness did not prevent are, I believe, here to welcome you to-night."

M. Duc was very heartily received on rising to receive the medal. He responded, in French, to the following effect:—

"*Chers Confrères*,—I was extremely touched with the announcement that the Royal Institute of British Architects had presented my name to your gracious Queen for the award of her Gold Medal. What I have done could not lead me to think of being designated for such an honour; and I am very proud and most happy to see my works crowned with the approbation of your Society. You know, gentlemen, one is never a good judge of one's own work, nor even of those of one's country; they must be sanctioned by the judgment of foreign nations, and yours is, for me, of great value. I receive, therefore, a supreme honour by the gift of this medal, and certainly my countrymen will participate in this reward. Nations can be rivals when it is a matter of conquest and interest. To-day, on this point, France, after severe trials, is most disinterested; and if she turns her eyes upon one part of the Continent, she confesses her inferiority in the art of destruction. She retires within herself, and desires to remain upon the ground of arts and of peace. In this path, *chers confrères*, we can unite our efforts so as to show to all people upon earth how the arts, and particularly architecture, honour a nation, and let us not forget that amongst the glories of antiquity, architecture is the most just expression of their greatness and their superiority. Look, for example, at that smallest part of the globe, which is named Greece, calling to witness her monuments and the treasures of your Museum; see with what lustre shines that art so perfect, which ever beams upon ours, and upon our taste. Therefore, if it be permitted to say that at the present time force takes precedence of right, never, I hope, will art be overcome by barbarism; and it may be affirmed that nations which have been rendered illustrious by art will have right to the respect and admiration of posterity. With this aim, *chers confrères*, let us unite the qualities which specially distinguish us. Born each with a different temperament, our two nations, by the union of their natural gifts, may produce perfect works. Here, *chers confrères*, permit a comparison which, amongst you, may be made without my being accused of irreverence. In your country,—producer of the finest breed of horses—you do not forget doubtless what share the crossing of breeds has had in it—those of the East and of Normandy. May it be the same for our art! You, Englishmen, shall bring the solid and brilliant qualities from your race, grandeur and hardihood of conception, a liberty and a power of execution which seem to increase in proportion to obstacles; I may add, an independence always moderated by the sentiment of the true and natural,—in fine, a taste remarkable and not without affinity to Greek art. We, Frenchmen, will bring our traditions of school and classical *ordonnance*, justified by a long experience of great epochs, and then—that grain of fancy which characterises Gallic wit. Such are, *chers confrères*, the elements of a good and profitable association. Let us hope that by our more and more intimate connexion and by mutual borrowings, brilliant results will be produced, and

force themselves upon the esteem of the whole world. I bring my humble thanks to the feet of your gracious Sovereign. I pray for the health of your illustrious President, and for the union of British and French architects."

The following medals and prizes offered by or through the Institute during last session were then presented by the president, by whom each recipient was addressed with a few words of encomium and encouragement:—

The Soane Medallion (for a design for a country house), to Mr. Josiah Conder.

A Medal of Merit (for a design for a country house), to Mr. J. O. Harris.

A Medal of Merit (for a design for a country house), to Mr. William Niven.

Sir W. Tite's Prize of 40*l.* (design for a concert-room), to Mr. Alfred Reading.

The Grissell Medal (design for a hall and staircase), to Mr. George D. Stevenson.

The Institute Medal and 5*l.* 5*s.* (for drawings of St. Alban's Abbey), to Mr. James Neale.

The Institute Medal (for drawings of Dryburgh Abbey), to Mr. James Lindsay.

The Student's Prize (for a design for a park lodge), to Mr. Henry Branch.

The Pugin Studentship (for the best set of drawings), to Mr. E. J. May.

A Medal of Merit (in the same competition) to Mr. Thomas Garratt.

A Certificate of Honourable Mention (in the same competition), to Mr. W. Talbot Brown.

At this stage of the meeting, Mr. F. P. Cockerell read a telegram in French, that moment received, to the following effect:—"The architects of France, assembled in Congress at the École de Beaux Arts, send their unanimous congratulations to Mr. Joseph Louis Duc, and their fraternal thanks to the Royal Institute of British Architects, on the occasion of the presentation of the Royal Gold Medal to their honoured colleague this evening. Signed, for the Bureau of the Congress, Bailly, president; Auguste Duvert and Lucien Etienne, secretaries."

Mr. C. F. Hayward called attention to an interesting series of drawings of coloured decoration found during the restoration of Copford Church, near Colchester. The drawings had been made at the instigation and at the cost of the Essex Archæological Society, who propose to reproduce them by means of chromo-lithography if a sufficient number of subscribers can be found. [We may add that they belong probably to the end of the twelfth century].

It was announced that the annual *conversazione* of the Institute will take place on July 12th.

This concluded the business of the Institute for the session, and the President then opened the proceedings of the Conference with these remarks:—

"I would now say a few words to open the Conference of 1876. This is the fourth that has been held, viz., in 1871, 1872, and 1874, previously. Of course it is not possible to point precisely to *exact* benefits of such meetings, but it is impossible to believe that the intercommunion of cultivated men having the same objects in view, and those *the* objects of their lives, will not be productive of benefit, not only to themselves but for the public, who are their clients. This Institute must naturally always be anxious to promote such objects, and rejoice if it can in some sort be a bond of union to all the architects of their country. While on these occasions we rejoice to impart to our visitors such information as we in London possess, we fully expect to receive much instruction from their varied experiences in return. I venture to anticipate that the meetings and visits that have been arranged for the next few days will be found both instructive and enjoyable. They have been arranged chiefly by the labour and efforts of Mr. Strong and Mr. Mathews, and if they are successful the merit will largely belong to those gentlemen as secretaries to the Conference committee, all the members of which, indeed, have been zealously anxious to lend interest to the visit to us of our country colleagues. At the end of the week, our labour over, I hope to be supported by a large gathering at the dinner which concludes the Conference,—that essentially English bond and evidence of good fellowship,—and now invite attention to Mr. Eastlake's paper."

Mr. Eastlake then read an Historical Sketch of the Institute, which we print *in extenso*, together with several other papers read during the week, with reports of the ensuing discussions, and we intend to print the remainder next week. Mr. T. H. Wyatt and Professor Donaldson spoke at the conclusion of the paper, and, on the motion of Mr. Godwin, thanks were voted by acclamation to the President, and the session came to an end.

GENERAL CONFERENCE OF ARCHITECTS.

THE fourth General Conference of Architects, held under the auspices of the Royal Institute of British Architects, commenced, as already stated, on Monday evening last, Mr. Charles Barry, president of the Institute, in the chair. There was a very large attendance of members and visitors from town and country.

On Tuesday morning, visits were paid to Mr. Matthew Allen's improved dwellings in flats for the middle classes, Manor-road, Stoke Newington; to two large blocks of buildings now approaching completion at Finnis-street, near Bethnal-green Junction, for the Improved Industrial Dwellings Company; and to the new blocks of buildings lately erected by the Peabody Trustees, Southwark-street. We will give some account of these buildings in our next.

On Tuesday afternoon at three o'clock a meeting was held in the rooms of the Institute, Conduit-street, to consider the subject of "Improved Dwellings" and "The Artisans' and Labourers' Dwellings Act, 1875."

Mr. George Godwin presided, and in opening the proceedings he said that it was very satisfactory to those who had been working for many years to effect some improvement in the houses of the poor, and to ameliorate the miserable condition of some of our large towns, to witness the public interest evinced in such questions; which were now recognised as being of supreme social importance, quite irrespective of the question of pounds, shillings, and pence. It was half a lifetime ago since these subjects had first engaged his attention, and the persistent manner in which the journal with which he was connected directed attention to the wretched condition of the dwellings of the poor and its evil consequences was at one time thought likely even to imperil its success. However, the subject was known to be of such serious importance that he and those who were acting with him were not deterred in pursuing the necessary inquiries; and it might be hoped that these endeavours had assisted in some measure in bringing about the present state of public opinion on the subject.

Mr. G. Vulliamy then read a paper on the "Artisans' and Labourers' Dwellings Improvement Act"; and

Mr. Fred. Chancellor followed with a paper on "Improved Dwellings for the Working Classes"; both of which we print.

Mr. C. F. Hayward also read a paper on the same subject; and it will be printed in our next.

Mr. Eastlake said he had received a letter from Mr. Charles Barry, regretting his inability to be present, and enclosing the following notes of operations to the present time at the Battersea buildings adjoining the people's park there, consisting of one block for self-contained dwellings, which include ninety-eight such tenements of three and four rooms each, and it is supposed will house about 500 persons; and two blocks for mixed dwellings, which contain 152 rooms, to be let as single rooms, or two or three together, and will, it is supposed, house about 350 or 400 persons. Laundries are provided in separate buildings for free use of inmates in rotation, as may be arranged by the resident superintendent. As to the accommodation and arrangements of the self-contained dwellings for these tenements, the sitting-rooms have an area of about 150 ft. each, and the bedrooms 100 ft. each, and all are 8 ft. clear in height. The kitchens are duly fitted with water, coal-bins, cooking range, and copper, and open into balconies. A water-closet is provided for each tenement, approached only from the open air. In the mixed dwellings the rooms are of various sizes, and also 8 ft. high in the clear, so arranged as to be capable of various combinations of one, two, or three in a set. All the larger rooms are fitted with sink and water supply. Coal-stores for each tenant are provided in the court-yard. The water-closets in these blocks are only approached from a transverse passage on each floor, open to the air at both ends, and connected with the staircases, thus ensuring easy access from every room, and at the same time perfect separation from all dwelling-rooms, and a continual current of air and consequent ventilation. Dust-shoots are provided on all floors of all buildings, emptying into a dust-pit in the court-yard, which can thus be cleared out periodically without inconvenience to the tenants. Windows are all made to open top and bottom, and are kept close to the ceilings of the rooms. A contract has been entered into for the erection of these buildings at a cost of 33,800*l.*, and they are in course of construction, and will be ready for occupation in the spring of next year. The buildings at Stroudvale, King's-cross, are laid out in four blocks,—viz, one block for self-contained tenements, which will contain 120 such tenements of three rooms each, and house about 500 persons; and three blocks for mixed dwellings, which will contain in all 640 rooms, and it is supposed will house about 1,000 persons. No contract has yet been taken for these blocks; but specifications and plans are now ready for tenders to be asked for them forthwith.

Mr. Thomas Blashill said he had received communications from Glasgow and Liverpool giving particulars of dwellings erected for the working classes in those towns. Mr. David Thomson, architect, Glasgow, sent four sheets of tracings showing as many designs for artisans' dwellings, all of which have been erected near Glasgow, from his plans. Plan No. 1 shows plans of ground and upper floor of a range of houses of two stories, each house containing a kitchen and two small bedrooms. In each kitchen the sink or scullery-box is placed in a recess. The ashes are collected in a cast-iron dust-bin placed on the back wall at foot of the stairs, with shaft to the upper landing of the stairs. The upper houses are entered from the stair landing, and in each alternate lodging or compartment a close or passage is made for access to these stairs and the land behind, on which are built the coal-cellars, wash-houses, and privies, with small gardens for the tenants. Plan No. 2 shows plans of two-story tenements of a little better sort: each house in this plan has a kitchen, with small scullery and two good rooms. The stairs are under cover of the roof, though open to the back, and each lodging has a close or passage from the front. The wash-houses, coal-cellars, ash-pits, and privies are built on the land behind. In both these plans each kitchen and several of the rooms have fixed beds in recesses formed for them. Plan No. 3 shows plans of a four-story tenement, such as is occupied in large towns by the better portion of the working classes. The ground floor is made into shops, and the three upper floors are alike, each floor containing three separate dwellings, entered from a common stair. The centre house has two apartments, with fixed recessed bed in each, and the two side houses have each three apartments (one very small), with recessed beds in two. Each house has a waterpcloset, entered from inner lobby, lighted from staircase, and ventilated by vertical pipes carried up through the roof. Fresh air is admitted to these waterclosets from horizontal pipes between joists of floors. Plan No. 4 shows plans of a tenement of houses of a class somewhat better than No. 3. The tenement is four stories, with shops on ground-floor and shop cellar below, and the shops are extended behind, forming saloons. The airing-yards for tenants in upper floors are formed on the asphalted roofs of these shop saloons, on which also are built ash-bins and washhouses. These airing-yards are entered from a landing of the first stair, the window being made in casements. Three houses enter from each landing of the stair, and each house contains kitchen, parlour, and bedroom, with water-closet, two of these being large enough to contain a bath. The roofs in this case are all formed of asphalte on wood joists and boarding. Messrs. H. & A. P. Fry, architects, Liverpool, sent particulars of a double block of dwellings, erected 1872–73, in Ashfield-street, Liverpool, for the Liverpool Labourers' Dwellings Company. The two blocks comprise 128 houses and four shops (the latter facing Latimer-street). The houses at either end of the blocks contain three rooms each. Those running lengthways contain three, four, and two rooms. Those con-

taining three and two rooms were more readily let. The shops were immediately let. That at the corner of Latimer and Ashfield streets (a baker's) being let at 20s. per week, payable quarterly. The remaining three at 12s. The rents of houses range from 4s. to 6s. 9d. per week. The land was purchased for 13s. per yard, and is freehold. The cost of buildings complete amounted to 18,634l. The dividend since completion has been at the rate of 4l. 10s. per cent. per annum. Between the two blocks is an open court paved with Buckley bricks, averaging 46 ft. 6 in. wide, having a cartway laid with asphalte down the centre, 10 ft. 6 in. wide, for Corporation carts to collect ashes, &c. The basement floors are all laid with cement. The four basements facing the west being devoted to washhouses and baths, which are let to one tenant. All upper floors are wood. The blocks are constructed on the balcony system, there being four staircases (stone) in all, and these under the main roof of the building. The balconies are continuous, running from end to end of either block, but not roofed. These balconies as well as the living-rooms of all the houses are lighted with gas. The rentals quoted prior to this include all taxes excepting in the case of the shop let at 20s. The gas is also included and shut off by the keeper at eleven o'clock p.m. Between every couple of houses will be noticed an ashpit-door on each balcony; under each of the shafts, beneath the basement floor, is a large receptacle for the ashes of eight houses. Immediately adjoining this ash flue is a flue containing all the pipes, down one side of which is a double casing for gaining access at any time, running from top to bottom of the four stories. On entering each house is found a scullery, with hot and cold water sink, with bunk underneath the sink for coals, chips, &c. On one side is the water-closet. From each water-closet is communication with a ventilating-shaft adjoining the flue for pipes. The property stands on nearly an acre of land. The staircase walls are faced with white glazed bricks.

Mr. Gatliff read the following paper :—

There are two points to which more especially I wish to call the attention of this meeting, as bearing materially upon the question before it, viz., 1st, the effect of the cost of the superstructure; and, 2nd, the much greater number of persons to the acre that are accommodated in the improved dwellings of the Metropolitan Association than are at present accommodated in the most densely-populated parts of the Metropolis, notwithstanding that more than one-half of the land appropriated to the improved dwellings is left open, as conducive to health and for safe recreation. In Westminster, which is the most densely-populated part of the metropolis, the population is only 235 to the acre, whereas in the dwellings provided by the Metropolitan Association, including in the areas the large court-yards and play-spaces attached, the average is 1,140 to the acre, and yet the rate of mortality during the last eight years has not exceeded sixteen per 1,000, while the rate in the metropolis generally during the same period has been twenty-four per 1,000. The total area of land occupied by buildings in flats of the Metropolitan Association, accommodating 817 families in crowded parts of the metropolis, is 156,732 superficial feet, and of this 74,620 superficial feet only are covered by the improved dwellings, five, six, and seven stories high, the remaining 82,112 feet being devoted to playgrounds for the children, and for improved ventilation, and still the ground-rents of these dwellings are at the very low figures, varying from 1¼d. to 1s. 6d. per family per week, or an average of 5¼d. per family per week, that it will be seen that the cost or rent of the land, when even so utilised, forms a very small portion of the rent necessarily charged for the improved dwellings, and bears very lightly on each tenant. The majority of the buildings of the Metropolitan Association are placed on three sides only of a piece of land, oblong in shape, the remaining portion of the land (including the drying-ground in the rear) being left open for recreation and ventilation; and I here venture to express an opinion strongly in favour of thus placing, as far as practicable, improved dwellings on such sites, if they can be had, at the same time I am fully aware that in very many instances each building must be adapted to the site which may not always have a frontage of, say 200 ft. by 100 ft. deep, but if on a site of such dimensions (and I incline to the opinion that no inconsiderable number of such can be provided in the metropolis when we read of clearances of from six to ten acres of wretched dwellings are in contemplation) upwards of 1,100 souls to the acre can be housed in more healthy dwellings, such improvements may be carried on with much benefit to our less fortunate fellow creatures, and with great advantage to the metropolis, in an architectural point of view. Another advantage in the improved dwellings being set back some distance from the main street with a large court-yard in front, is, that wider areas to the basement dwellings can be obtained which will be better protected from filth and annoyance; but in making this remark it must not be understood that I am an advocate for dwellings in basements. At the same time I have no doubt that very many members present have often come in contact with sites where the excavations had to be made to a great depth to obtain a good foundation, as was the case with this Association, who, in one instance, had to excavate to the depth of 23 ft., and in another to keep a steam-pump at work for two months. And I only allude to this point in support of my position, and to state my experience that such spaces may be safely utilised for improved dwellings if kept well out of the ground with areas 6 ft. or 7 ft. wide on each side. I fully endorse the remarks made by Mr. Chancellor on the advisability of a separate water-closet being as far as practicable provided for each family, and the means afforded to each family of washing "their own dirty linen at home," and not that it and five hundred other matters should be incessantly discussed in a washhouse in common, which is my experience of them, and they are discontinued by the Association I have the pleasure of representing. I may here mention a circumstance which occurred twenty-eight years ago in our first dwelling in the Old St. Pancras-road, as showing the beneficial effect of giving a separate water-closet to each family, and that the closet or scullery in which it is placed should be approached from a separate lobby. Out of 100 sets of rooms in the building, some few of the sculleries were approached direct from sitting-rooms, the others being approached through the main entrance-lobby. In a very short time some of the tenants asked the superintendent, as a favour, that so soon as any of the last-mentioned dwellings became vacant, they might be allowed to change into one, as "you see," they observed, "if we have a few friends to see us, every one knows where we are going when we enter through that door,"—pointing to the door which opened direct from the sitting-room to the scullery. I am satisfied that attention to these minor points has a refining effect upon the tenants. I also endorse Mr. Chancellor's views that a second room, kitchen, or scullery should be attached to each dwelling, almost however small, as nearly thirty years' experience enables me to state my conviction that the class we accommodate do themselves desire to afford to pay the rent of two rooms, and will make personal sacrifices in other things to pay the extra money for them, and I would submit to this meeting that, in erecting improved dwellings, the plans should be settled for buildings which are occupied for many generations, and that the public and many of those who have had considerable experience in the working and effect of this movement hitherto are anticipating the approach of the time when every family in England will have at least two rooms to live in. I have elsewhere made similar remarks in support of this view, that too many single rooms should not be provided to accommodate the class that may be displaced under the Artisans' Dwellings Act, 1875. Having had some experience in the working of Mr. Matthew Allen's patent for making an excellent artificial stone, which he very liberally threw open to the public, and this Association having used it to a great extent in their new dwellings in the Farringdon-road, both in construction and to render those dwellings fireproof, I have pleasure in bearing testimony to the great saving in cost and labour and other advantages in using it very liberally. Instead of turning arches over the windows, and for door-heads and stairs, and for making fire-proof floors, as all combustible matter in its component parts (gas breeze, and cement) having in the manufacture been exhausted, it forms no inconsiderable guarantee for its use for this latter purpose. The Metropoliton Association also, on one occasion, tested the fire-proof qualities of this artificial stone, in the presence of Colonel Galton and other gentlemen, by placing a large thick slab of it over a very hot coke fire for several hours, and another block of the same dimensions, made of the same cement and small ballast, was put over a similar fire; the block made on Mr. Allen's principle was not charred a quarter of an inch deep, while the other block cracked in several places. I regret very much that absence from town, through illness, prevented my forwarding a list of dwellings which your committee kindly offered to include in your labours of to-day by visiting them, but probably some members of the Institute may have seen them on previous occasions, or may still do so. It has afforded me much pleasure to send here some of the working drawings showing the plans of the improved dwellings and their disposition on the land.

Mr. Matthew Allen said that one great defect in the buildings described by Mr. Chancellor was that there was no through ventilation to them; they merely followed out the principle of back-to-back building. He (Mr. Allen) claimed to be the originator of the plans of the buildings erected by the Improved Industrial Dwellings Company.

Mr. F. H. Fowler said that, as an architect and a member of the Metropolitan Board of Works, he had paid some attention to the subject, and he could not help viewing with some apprehension the working of the Artisans' Dwellings Act of last year, as it would tend to localise the poor in particular districts for ever. He thought this was an unfortunate thing for the metropolis, because the blocks of buildings erected under the Act, in place of the loathsome slums which at present exist in many districts, might, a few years hence, seriously impede, if they did not altogether render impossible, many important schemes of street improvements. It was unfortunate that the Artisans' Dwellings Act did not go hand-in-hand with a Street Improvement Act, so that while, on the one hand, means were afforded for removing and rebuilding unhealthy dwellings, advantage might be taken of the clearances made to widen existing streets, or to open up needed lines of communication. There was no doubt great credit due to those gentlemen who had been engaged for so many years in studying this question, and in insisting on the necessity of better dwellings for the people, but so far, he was afraid that very little had been done, and that the improved dwellings which had already been erected had not been, and were not, tenanted by those poorer classes by whom they were most needed. The question of providing healthy dwellings in towns, at rents which the tenants could afford to pay, and which should, at the same time, be remunerative, was one beset with difficulties in all directions. Whatever might be the progress made in the future, he hoped that a little more attention would be bestowed on the architectural effect of the buildings yet to be erected in London for the working classes.

Mr. Henman, of Stockton-on-Tees, said that some time ago he was asked by the president of the Cleveland Institution of Mining Engineers to read a paper on this subject, which presented a somewhat different aspect when considered with reference to the requirements of the provincial towns as compared with the wants of the metropolis. Many of the improved dwellings for artisans in Stockton were four-roomed dwellings, but were fearfully over-crowded. He had a careful census taken of two streets of average quality, and found that in some of the dwellings eleven people occupied one bedroom. The reason of that was that the tenants could not pay the rent demanded for the tenements, so that they took in lodgers. There was great room for improvement in the mode in which these dwellings in Stockton were built, for they were generally the work of speculating builders.

Mr. T. Roger Smith said he had been concerned some years ago in building some cottages for agricultural labourers, and they were provided with an additional bedroom on the ground-floor; but it was soon found that the tenants preferred to use this room as an extra sitting-room. This fact showed that before building dwellings for the working-classes care should be taken to understand their habits and requirements. The tall buildings which had been so largely erected in London afforded, no doubt, the most economical means of housing the poor in towns, and the balcony system of arrangement would produce the best result at the least cost. Miss Octavia Hill had preferred to adopt this plan, whether in building new houses or in adapting old ones.

Mr. Boardman, Norwich, said it was proposed to put the Artisans' Dwellings Act in force in that city, but he did not think it would be necessary there to erect such lofty buildings as were

built in London in the form of improved dwellings, owing to the fact that Norwich occupied a very large area in proportion to its population, almost every house having its garden. Even were it decided to build such lofty erections, he did not think the people could be got to inhabit them if they went higher than two stories.

A gentleman from Dundee, who said he was the Convener of the Works Committee of the Dundee Corporation, stated that most of the artisans' dwellings in the town had been built by speculating builders, in a manner far from satisfactory on sanitary and structural grounds; but since the Corporation had obtained a local Act, giving them greater power of control over these erections, there had been a marked improvement.

Mr. Carroll, Dublin, said it seemed to him that the buildings which had so far been put up in London did not meet the necessities of the poorer classes,—of those, indeed, for whom improved dwelling accommodation was most needed. One point as to the Artisans' Dwellings Act was that it appeared as he read it, to require the performance of an impossible feat by those who had to put it in force. Suppose they took an exceptionally crowded area of small extent, it would be sometimes utterly impossible to provide healthy homes for the same number of people as had been displaced on the area unless the buildings were carried to an extravagant height. It was much to be desired that more could be done towards improving and rendering healthy the existing dwellings.

Mr. Aitchison said he had looked over many of the large blocks of dwellings which had been erected of late years, and they all appeared to be characterised by a great want of economy in construction and arrangement. There was an excess of staircases and a redundancy of useless walls. Again, no attempt was made, as it might easily be in such buildings, to systematically ventilate and warm all the rooms, and in many other respects improvement was needed.

Mr. Porter thought it was highly essential that all dwellings should have thorough ventilation, and all water-closets should be approached from a lobby or passage, or from outside the walls, and never direct from any of the rooms. It was also of the utmost importance that each dwelling should be self-contained, and have its own conveniences. From all information he could glean as to what had already been done he found that no building to be used for the purpose of improved dwellings ought to cost more than 7d. per foot cube if a return of 5 per cent. was expected.

Mr. Blashill said he wished to remark, in reference to what had been said by Mr. Carroll as to the Artisans' Dwellings Act, that there was a saving clause which seemed to present two important loopholes for escape from the strict letter of the Act. It recited that at least as many persons should be provided for in the buildings to be erected under the Act as were displaced by the demolition of the old and unhealthy property, "unless there are any special reasons to the contrary," or unless a site could be obtained "in the immediate vicinity" of the property demolished. Interference with light and air to contiguous property might, he thought, be fairly urged as a "reason to the contrary" if it were proposed to erect buildings of too great a height in order to house all the inhabitants displaced on one particular spot.

Mr. Fowler said he thought very strong reasons would have to be shown before the Board of Works would give up the literal requirement of the Act, in that respect.

Mr. Roger Smith submitted the following resolution:—That the best thanks of the Conference be given to the Chairman and those who have aided in the discussion of labourers' dwellings by contributing papers, lending plans, and assisting those who have visited existing buildings. And this meeting, while recognising the great value of the results already attained, agrees that the subject still demands the best attention of architects, both as regards arrangement, economy, and artistic treatment.

Mr. Thomas Drew (Ireland) seconded the motion, and in doing so, expressed the thanks of himself and the provincial members of the Conference for the readiness with which the London architects were willing to impart their valuable experience to their Irish, Scotch, and provincial *confrères*. This was done in so generous a manner, and with such a total absence of exclusiveness, that it was highly valued; and the manner in which the professional men of London had placed themselves at the disposal of their visitors would be gratefully remembered.

The motion having been carried,

The Chairman, in returning his thanks, said he thought it was quite clear that the Artisans' Dwellings Act, whatever its imperfections, would afford the means for making very considerable improvements in the worst districts of London and our large towns, and he should, therefore, be sorry if Mr. Fowler's objection to it were to assume any tangible shape or to be strengthened in any way by anything said during the present discussion. With some defects, the Act afforded an opportunity of clearing away many of those frightful dens which had so long been helping to deteriorate the moral and physical condition of large portions of the London population. So long ago as 1854 he published a drawing of the various rooms of a house in one of the courts behind Gray's-inn-road (included in the present scheme), which exhibited a revolting state of things; yet up to the present time the place had remained in the same horrible condition. He hoped that the schemes at present before the Metropolitan Board of Works would have the aid of Mr. Fowler and his colleagues. One mistake made at the outset of the Holborn scheme was in making the widening of Gray's-inn-road an integral part of the project, and this proposal, if persisted in, would have wrecked the whole scheme by raising opposition. The owners of the property in Gray's-inn-road, which was in a fairly good sanitary condition, naturally objected to be compelled to sell their property ostensibly for a sanitary purpose, but in reality for effecting a public street improvement; for whereas, for the purposes of the Artisans' Dwellings Act, property may be compulsorily purchased at the bare market value, for the purpose of street improvements owners were able to claim 10 per cent. in addition for being compelled to sell. The scheme had very wisely been amended, and although when it came to be carried out a favourable opportunity would be afforded for widening Gray's-inn-road, the latter object must be effected by other arrangements. With regard to the Holborn scheme, he must confess he thought the large number of one-roomed dwellings (650 he thought) objectionable, and he hoped the point would be carefully reconsidered by Mr. Vulliamy and the Board. Mr. Chancellor's paper was an excellent one, and stated principles which should never be lost sight of in designing dwellings for the poor. He was glad to note that in the course of the discussion the necessity for separate water-closet accommodation to each dwelling was almost universally insisted upon, for he was perfectly satisfied that the nonobservance of this principle had been the cause of much demoralisation. He observed with regret that in the new Peabody dwellings in Southwark-street a separate water-closet was not provided for each family; but it was to be hoped that the Peabody trustees would, for the future, provide a separate water-closet to each tenement. As to architectural adornment or decoration, important as it was in refining the taste of the people, even that should be sacrificed if thereby the rooms could be made larger and more airy, and therefore healthier. A room too small for its purpose meant overcrowding, and overcrowding meant sickness and death. Many of the rooms in the dwellings which had been built of late years were certainly too small. It was worth consideration how far, by means of improved construction — such, for example, as the use of concrete—the erection of these dwellings might be cheapened. He could not agree with Mr. Hayward, that the poorer classes themselves should be asked to say what they wanted, for they did not know what they ought to have. Many of them had no notion of the laws that governed health, and did not care how small and how dirty a place was, so long as it was warm enough. Therefore to ask them how little accommodation they required, would lead to no good. The question of improving the dwellings of the working-classes was not a mere question of money; it was a matter of life and death. People talked about not building dwellings for the poor unless they could be made to pay 5, 6, or 7 per cent.; but it was absolutely necessary for the safety of England that the poorer part of its population, in town and country, should be housed with something like decency, healthfulness, and comfort. He hoped that the present meeting would give a fresh impetus to the thoughtful study of the question.

The meeting then terminated.

On Tuesday evening, at half-past seven p.m., Mr. Edmund Sharpe delivered a long and able lecture on the "Architecture of La Charente," being critical and descriptive notes on the Architectural Association's excursion to the South of France last autumn. The audience must have numbered between 500 and 600 persons, the meeting-place being the large hall of the Co-operative Institute, Castle-street East, Oxford-street (lately known as the Princess's Concert-room). The whole available wall-space was covered with screens to which were affixed drawings enlarged from measured and other sketches made by the excursionists themselves. A large number of gentlemen attending the Conference were present, and a discussion ensued in which Professor Donaldson, Mr. Penrose, Mr. Phené Spiers, and Mr. Roger Smith took part. Notice of Mr. Sharpe's lecture and of the discussion will appear in our next.

On Wednesday afternoon, at two o'clock, a visit was paid to Messrs. Cubitt's workshops, Gray's-inn-road. This establishment has lately been so fully described by us * that we need do no more in this place than to chronicle the visit.

On Wednesday evening, at eight p.m., a meeting was held at Conduit-street. Mr. E. M. Barry, R.A., occupied the chair. The subject for discussion was Greek Art, and the walls were hung with a large number of water-colour drawings by Mr. F. C. Penrose, Mr. R. Phené Spiers, and other gentlemen, illustrative of the Parthenon and other temples.

The first paper was read by Mr. Burges, who chose for his subject "The Importance of the Study of Greek Art and Literature to the Practice of Gothic Architecture." The paper was received with great approbation.

The second paper read was by Mr. R. P. Pullan, on "Greek Art as illustrated by its Monuments." This paper will be found on page 584.

The Chairman, before inviting discussion, moved the thanks of the Conference to Messrs. Burges and Pullan for their papers. Mr. Burges, with his well-known proclivities for Gothic art, had treated the subject in a broad and highly appreciative manner, while Mr. Pullan's paper was well worthy of one who had done so much in the shape of research in connexion with Greek art in Asia Minor.

Mr. Phené Spiers explained that at the time Mr. Fergusson read his paper on the Erechtheum, a month or two since, it was thought desirable to adjourn the discussion of the many important points raised by that gentleman for further consideration by the Conference, but when the arrangements for the Conference came to be made, Mr. Fergusson was in such a state of ill-health as to preclude the hope that he would be able to attend. It was, therefore, thought advisable to discuss the question of Greek art generally, and Mr. Burges and Mr. Pullan had very kindly consented to prepare papers on the two aspects of the question which were before the meeting.

A long and interesting discussion ensued, in which Messrs. J. Wood, Ordish (Leicester), J. P. Seddon, Charles Barry, Watkiss Lloyd, Hiscocks, H. H. Statham, and Arthur Cates took part, the Chairman offering some observations in conclusion. The discussion will be more fully noticed next week.

On Thursday morning many of the gentlemen attending the Conference paid a visit to Westminster Abey, by permission of the Very Rev. the Dean. The visitors assembled in the Chapter-house, whence they were conducted over the abbey by Sir Gilbert Scott, R.A., Mr. Micklethwaite, and Mr. King. Some of the party afterwards visited the Architectural Museum.

On Thursday afternoon, at three p.m., a meeting was held at Conduit-street, Mr. J. Whichcord, vice-president, in the chair, to discuss the subjects of "General Building Regulations for the United Kingdom," and "The Registration and Classification of Houses." The programme comprised papers on the former subject by Mr. J. Honeyman, Glasgow, and by Mr. J. Clarke, Liverpool; and on the latter subject by Mr. Henry Parsons, London, and Mr. J. Sellars, Glasgow. Mr. Clarke's paper will be found on p. 594, followed by that of Mr. Sellars. Mr. Honeyman's and Mr. Parsons's papers will be given next week.

On Thursday evening, at eight p.m. many members attending the Conference assembled in the Institute meeting-room to hear a paper, by Mr. R. Phené Spiers, on "Egyptian Architecture," which was arranged for by the Society for the Encouragement of the Fine Arts. An abstract of this paper, together with a report of the ensuing discussion is deferred.

* See p. 211, *ante*.

AN HISTORICAL SKETCH OF THE ROYAL INSTITUTE OF BRITISH ARCHITECTS.

BY MR. CHARLES L. EASTLAKE, SECRETARY.

In attempting to give a sketch of the history of this Institute, whose members and friends are assembled in so large a proportion to-night, and with which I have had the honour of being officially connected for the last ten years, I must preface my remarks by reminding you that it is but a sketch, and that to record with anything like fidelity the career of a society which has existed for nearly half a century, would be to fill not a single number, but a volume of our Transactions with details which, however interesting to you individually, would be tedious if presented as a whole. I shall, therefore, content myself with a rapid survey of the rise and progress of the Institute, describing as briefly as I can the original objects of its foundation and the extent of their development, the schemes which it has entertained for protecting and promoting the interests of our profession, and the work which it has accomplished in that direction. I shall endeavour to point out the causes which have been conducive to its prosperity, and the difficulties with which it has had to contend. Finally, I hope to explain the mode and manner of its administration as at present organised; and if in conveying this information I haply succeed in enlightening some of our professional brethren who are present to-night as visitors, and who have a somewhat vague idea of what the Institute is, as compared with a still more indefinite idea of what it ought to be, my paper will have served its modest purpose.

The earliest corporate association formed by the followers of our art it would be difficult to name. It probably existed, in common with other ancient guilds, during that golden age described by a certain Quarterly Reviewer when the "Master Workman" flourished in all his glorious independence. But, coming down to more modern times, perhaps the first Institution formed by professional men, with aims and objects similar to our own, was that of the London Architectural Society, established in 1806. This society had a president, four vice-presidents, a treasurer, and a secretary. It included in its ranks ordinary and honorary members. The former were required by its rules "to produce annually, according to rotation and time agreed on, an architectural design never before in any way made public, and accompanied by observations, critical and explanatory, under forfeiture of two guineas; also an essay, under forfeiture of half-a-guinea."

The object of the society's meetings, held once a fortnight, was to discuss the designs, observations, and essay above mentioned, and every member absenting himself for two successive nights incurred a fine of 5s., unless prevented by illness or a distance of ten miles (an excellent rule, which I venture parenthetically to recommend to the notice of our finance committee as a legitimate and, perhaps, fertile source of income). The designs and essays remained the property of the Society, who published such as they thought worthy of that honour, kindly presenting the author with two copies for himself.

The proposal of new members by nomination paper, and the subsequent election by ballot, resembled the forms still adopted by this Institute. The *raison d'être* of this society is given in a preface to their first volume of Transactions, where it is stated that,—"Among the institutions so liberally established in this city there is not one calculated for the encouragement of architecture. The feeble protection afforded by the Royal Academy can hardly be deemed an exception. The lectures have long ceased and medals privately distributed, and the use of the library for a few hours one day in the week, at a time when it is hardly possible for a student of architecture to attend, cannot be deemed of much value."

Thus we see that even in the early days of the present century architects conceived that they were neglected by the R.A. The list of members included many names which are well known at the present day in connexion with our profession, such as Ashpitel, Beazley, Billing, Elmes, who wrote the "Life of Wren" and other works, Peacock, Savage, Taylor, and Joseph Woods, the well-known author, and editor of the fourth volume of Stuart's "Athens."

How long this association existed I have been unable to ascertain, but it probably became extinct some time before the formation of the Architectural Society, which was instituted in 1831. The primary objects of this Society were stated to be "the advancement and diffusion of architectural knowledge, by promoting the intercourse of those engaged in its study, the ultimate desire being to form a British School of Architecture, with the advantages of a library, museum, professorships, and periodical exhibitions." For this Society all persons who had studied the profession of architecture in the office of an architect for five years were eligible as candidates. The rules provided for the admission of honorary (foreign) members, amateurs, and students under twenty-one years of age. The council consisted of eight members, besides a president, two vice-presidents, a treasurer, and secretary,—to be chosen annually,—Mr. Thos. H. Wyatt being among the first of the vice-presidents. The general meetings were to be held on every alternate Tuesday, beginning in November and ending in June. A curator was appointed to take charge of the library and museum, and, judging from the fact that he was to be elected every three months, we may assume that the office was honorary. The president (Mr. W. Barnard Clarke) and many other members presented casts and books, to which, under certain restrictions, the students had access at the Society's rooms in Lincoln's-inn-fields.

In January, 1834, we find that a meeting of architects and surveyors was held at the Freemasons' Tavern for the purpose of forming another society "*for the study of architecture and architectural topography.*" Some difference of opinion seems to have been expressed at this meeting as to the objects of the proposed Institution, and the condition of its membership. The consequence was a secession, and certain of the gentlemen present agreed to hold another meeting at the Craven Hotel. This resulted in the appointment of a committee, consisting of Messrs. P. F. Robinson, Kendall, Goldicutt, Fowler, Donaldson, Donthorn, Noble, and others, who were requested to draw up a scheme for the formation of an Institution calculated to uphold the character and improve the attainments of the architect. At a subsequent meeting Messrs. Barry, Basevi, Burton, Cresy, J. Gwilt, Hardwick, Kay, Lee, Sir J. Rennie, Papworth, Robinson, Seward, and G. Taylor, were elected as original members.

Here, then, we have the nucleus of that society which was afterwards known as the Institute, and, subsequently, as the Royal Institute of British Architects. Of its later coalition with the Architectural Society, or, rather, with certain members of it, I shall speak hereafter; but to various arguments for and against that coalition,—the pardonable rivalry which seems to have existed between the two institutions, and the expressions of personal feeling which it elicited, I shall not refer. Such details would have but little interest for the present generation, and had best be buried in oblivion. It will be well, however, to remind you that in, and at the outset of, their endeavours to establish the Institute its founders had to encounter numerous difficulties; that they met with frequent and long-sustained opposition from more than one quarter; that many members of the profession held aloof—as some will at the present day—from various motives, and had to be won over by arguments and persuasive proselytism which must have taxed the ingenuity and tired the patience of those who undertook the task. But they went on bravely—this little band of architects, and by degrees their labours were rewarded. Recruits came in from here and there, and their numbers increased with cumulative power. Petty jealousies died out in time; trivial objections were answered or explained away; personal considerations disappeared before the more important object of professional integrity, and the Institute became a fact.

As we glance down the list of its original members, and recollect that two-and-forty years have passed away since they first incorporated themselves for the purpose of accomplishing their laudable object, we shall not expect to find many who have lived to see the present development and extension of their scheme. The elder Kendall, Papworth, Robinson, Goldicutt, and others, to whose individual exertions the Institute is indebted for its earliest organisation, are gone, but among the veteran survivors who were elected in 1834 we may still note the names of Thomas Bellamy,* Decimus Burton, and Professor Donaldson. It was the object of these gentlemen and of others with whom they were associated, to secure for the earliest members of their society architects of prominent position and unimpeachable character, educated for, and following their profession as an art, and free from those conflicting relations with trade which in the early part of this century certainly did exist in some instances, and prevented that implicit confidence on the part of the public which should enable a client to regard his architect not only as his agent, but as his friend and adviser. The rules for professional practice then drawn up, and which formed the basis of those still in existence, secured this fundamental object, as far as it is possible to secure it by such means.

With regard to other qualifications for membership, the hard and fast line which it was at first found necessary to draw has been modified of late years. But it must be remembered that in the early days of this society, that honourable and eminently useful calling, which has since attained the dignity of a profession, was in its infancy, and its true position had not been realised. Few who remember the class to which the "Builder's Measurer" then belonged, would have recognised in it a prototype of the modern "Quantity Surveyor." I should not have alluded to this subject but for the fact that it occupied considerable attention at the very birth, so to speak, of the Institute, and that the question whether or not surveyors should be admitted as members formed a point of contention between the Society of British Architects and the Society of Architects and Surveyors, with whom an alliance was sought. Except on this point, the reports of the two committees appointed to confer with each other nearly corresponded. After several meetings, much discussion, and more correspondence, a certain number of the original, though junior society, were elected members of the Institute. Sir John Soane contributed the sum of 750*l.* towards its funds; and the medal, which still bears his name, was founded in acknowledgment of his liberality.

Earl de Grey, an amateur of considerable cultivation and artistic taste, was chosen as president, and Messrs. Donaldson and Goldicutt were appointed the first honorary secretaries. Rooms were engaged at 43, King-street, Covent-garden, better known as Evans's Hotel, a building said to have been designed by Inigo Jones, and celebrated in later, though still classic days, for songs and suppers, which have been immortalised by Thackeray in his description of "The Cave of Harmony." There the first general meeting of members was held on the 15th of June, 1835, though, strictly speaking, the Institute was founded in the previous year. In his opening speech, Lord de Grey pointed out the objects with which the society had been established, and described the advantages which architecture, as a national art, would derive from its foundation. His remarks were followed by an able address from the Senior Secretary, who was enabled to state that nearly eighty members had already been enrolled, that through the courtesy of the Foreign Office communication had been opened with several of the Continental academies, and that the nucleus of an excellent library had already been formed. Mr. Donaldson expressed his hope—a hope which he has lived to see realised—that in due time prizes would be offered to young architects for original designs and measured drawings of ancient buildings. He referred to the opportunities which would arise for discussing at the periodical meetings of the Institute questions of scientific and antiquarian interest, and he adverted to the possibility of establishing a fund which would aid the student in foreign travel. In short, Mr. Donaldson foreshadowed most of the projects which the Institute has since been enabled to carry out, and it is a tribute to his sagacity to observe that these early records, which I have perused with deep interest, include no visionary schemes which have since been abandoned, or ambitious prophecies which remain unfulfilled. Since those days the Institute has indeed extended the sphere of its work, and largely added to its aims; but in the path which its founders opened there has been at least, so far as I can trace, no retrogression. No castles in the air have vanished, because none were ever designed.

In regard to the subdivision of members the general conditions of membership, the formalities of election, the regulations respecting ordinary general meetings, and many other matters, the bye-laws drawn up in 1835 are almost identical with those of 1876. Even the amount of subscriptions, except in one particular, remains the same. The Council has indeed doubled its number of ordinary members, but its constitution in other respects is unaltered. The earliest

* After this paper had been read, the sad news of Mr. Bellamy's recent death was communicated to the meeting.

programme of our sessional papers on record includes the same variety of subjects which we are accustomed to hear discussed at the present day. The recent discovery of the crypt at York Minster, an essay on Building Stones, a list of queries for architectural investigation, a biographical memoir, the description of a tunnel sewer, a paper on "Ventilation and the Construction of Flues," another on "Suspension Bridges," and a "Review of Professional Practice." Such were the themes which interested the last generation of architects, such are the themes which attract—or, shall I say, ought to attract us?—in our day.

At the first inaugural meeting, a medal was offered for an essay "On the Nature and Properties of Concrete." This was gained by Mr. George Godwin, who dealt with the subject in a very able and exhaustive treatise. The Institute soon after published a useful little pamphlet, entitled "How to Observe," containing a series of suggestions for the purpose of aiding antiquaries and amateurs of architecture in their communications to this Society.

For the first year or two, as may be supposed, the funds of the Institute did not permit any regular and official publication of the sessional papers, though some exceptions occurred, and the Council always claimed the copyright of such papers until a certain interval — twelve or eighteen months—had elapsed after the date of reading. Nor were there for some time any external facilities for giving publicity to these communications. When the Institute was first established I believe no strictly professional journal, in the present sense of the word, was in existence. The *Civil Engineer and Architect's Journal*, however, was started in 1837, and continued to be published until 1849. In this periodical may be found abstracts, and after a time full reports of papers read at ordinary general meetings of the Institute.*

In 1836 the Council reported to the general body of members as to the expediency of procuring a Charter of Incorporation for the Institute. The expense was estimated at 300*l.*, and Mr. W. L. Donaldson, then honorary solicitor, undertook to prepare the draft. A resolution was passed at a general meeting adopting this recommendation, and a subscription was at once opened towards defraying the cost of the charter. By the following year the charter, obtained through the influence of Earl de Grey, had been printed, with the bye-laws attached to it, and circulated among the members. This step at once gave stability to the Institute, and placed it on the same footing as other incorporated societies. In the same year the Institute moved from its old quarters in Covent-garden to the more aristocratic neighbourhood of Grosvenor-street, where, at No. 16, it occupied rooms for many years afterwards. By this time Mr. Chas. Fowler had succeeded Mr. Goldicutt in the position of joint secretary with Mr. Donaldson, and the two names were long and honourably associated. In their report to the annual meeting in 1837 the Council naturally congratulated the general body of members on their improved position, one of the first fruits of which had been an exchange of Transactions with the Royal Societies of London and Edinburgh, the Royal Society of Literature, the Royal Geographical Society, and the Institution of Civil Engineers. The Society of Antiquaries and the trustees of the British Museum contributed some valuable works to the library. Meanwhile, communications with foreign societies had been extended by the election of new honorary and corresponding members of the highest reputation on the Continent.

In 1838 a proposition was made by the Architectural Society for the incorporation of that body with the Institute. Committees were appointed on either side, and after several meetings agreed upon a scheme of union which it was hoped would give mutual satisfaction. But, unfortunately, though it met with approval from the Institute, it was rejected by the Architectural Society. The result was that eighteen members of that body withdrew, and, of them, thirteen were at once elected members of the Institute. In reviewing this and other attempts to secure for the profession of architecture that unanimity of practice and principle which would naturally result in the establishment of one representative guild, and one only, it is almost superfluous to point out the obvious advantages of such a scheme, regarded theoretically, and the practical difficulties which, if we may judge from experience, invariably arise in the course of its realisation. It is true that in the legal and medical professions, for instance, the absolute necessity of united corporations has long been recognised. But it must be remembered that the conditions under which those corporations have been formed are widely different from any which we can hope to see founded in the present era of architectural practice. The absence of a legally authorised professional diploma as a condition of membership will in itself account for the existence of a large body of outsiders who from conviction or temperament are indifferent to what we are accustomed to call *esprit de corps*, and while this independence of action is maintained by individuals, we cannot be surprised if it tends to the formation of distinct societies. But, apart from this cause, it must be remembered that artistic aspirations form, or are at least supposed to form, an important element in our professional status. Now, it is notorious that art societies multiply more rapidly than any others, and for my own part I believe it is only because architecture is a business as well as an art that we have not a dozen institutes at the present time;—so diverse are the aims, and so opposed are the principles which may be recognised in our profession from an æsthetic point of view.

One of the first important steps taken by our Society, at the time to which I am now referring, was the appointment of a committee to consider the question of public competitions,—a subject of peculiar interest then, as indeed it has frequently become since. The committee issued their report in 1839, and it obtained a wide circulation. In glancing at this official record of opinion on a theme which has now grown threadbare by discussion, one is struck by the similarity between the arguments, grievances, and remedial suggestions enumerated by the last generation and those with which we are familiar in the present day. The advantages of the system are few but definite. It encourages emulation which, within limits, is of course a very desirable quality in any artist. It offers an opportunity for rising genius which might otherwise languish unencouraged. It opens a range of choice in respect of taste and technical skill which is of singular advantage to a public too often hopelessly ignorant of our art. On the other side, as we all know, the system presents a melancholy picture of professional jealousy, disappointed hopes, underhand jobbery, and sometimes, though let us trust less frequently now than formerly, instances of cruel and deliberate injustice.

In saying that there has been no departure from the scheme originally proposed by the founders of this Institute, I ought, perhaps, to note one exception. The periodical delivery of lectures on scientific subjects connected with the study of architecture, *e.g.*, acoustics, geology, and the use of iron, formed part of the early programme, and for a time proved attractive, but at length the attendance of members fell off, and the Council did not feel justified in incurring the additional expense entailed, for the lecturers were paid for their services. Meanwhile, the Institute prospered in more than one sense. The library was continually enriched by donations from foreign members. Many of the nobility became honorary fellows (I only wish the list was longer at the present time), and the Queen graciously allowed her name to be announced as patroness. It is a curious evidence of the urgent need which had been felt for the establishment of the Institute and the guarantee which it affords for the integrity of professional practice, that the Council, in their report for 1840, took occasion to disclaim, on behalf of all respectable architects, any share in that pernicious system which had once permitted their accepting a commission from tradesmen in addition to that received from their clients. The bye-law which prohibits, under pain of expulsion, any member from receiving such a gratuity was then, as it still is, in existence, and afforded material for the first, if not the best, answer to that invidious question which has sometimes been asked,—What is the use of the Institute? In 1841, the appointment of Lord De Grey to the office of Lord Lieutenant of Ireland deprived the Institute for a while of the advantage of his personal attention, but by this time Mr. Donaldson, who had retired from the position of honorary secretary, though he still conducted (I need scarcely say how zealously) the foreign correspondence, was elected a vice-president, together with Mr. Charles Barry and Mr. Philip Hardwick, both Royal Academicians, and both gentlemen who occupied the foremost rank in our profession. With such deputies as these it will be obvious that the president's absence was less felt, and, indeed, the *éclat* which in the eyes of the outside world attached to his social rank was probably more than compensated for within the walls of the Institute by the fact that the chair was now filled in turn by three architects of undoubted popularity and attainments. The Institute possessed an additional advantage in the services of Messrs. Charles Fowler and George Bailey as honorary secretaries.

Among the papers read at this period was one which deserves especial mention. I mean the valuable essay on "Vaulting in the Middle Ages," contributed by Professor Willis, and at the time of its publication one of the most learned and exhaustive treatises which had appeared on the subject. The Council paid it a tribute of respect which no other of our papers has received before or since. An extraordinary number of copies were printed, and the sum of 400*l.* was devoted to meet the expense of the volume for that Session. It is needless to add that that was not paid out of income, and considering the state of the Institute finances, it may be regarded as a somewhat bold investment. About this time a proposal was made to secure more convenient quarters for the Institute than those in Grosvenor-street, but it came to nothing, and several years elapsed before premises were secured elsewhere.

In the year 1843 the question of competitions was again brought before the Institute on the motion of Professor Hosking, who seems to have condemned the whole system except in cases where every competitor was paid for his work. The subject was discussed at a general meeting, but with no practical result beyond the ventilation of opinions which I suppose are pretty much the same as have always been formed on the matter. That there have been, and unfortunately still are, conditions attached to public competitions which are disgraceful to those who offer them, and still more disgraceful, from a professional point of view, to those by whom they are accepted, is an abstract proposition which no one in this room would be likely to deny. But unfortunately the only remedy lies in a measure that would probably be a worse evil than the one we wish to remove. It would, of course, be possible to shape the conditions of membership of this Institute in such a form that no one connected with it could take part in objectionable competitions. But it may be doubted whether it is not preferable that such competitions should exist than that a body of professional men should adopt rules based on principles analogous to those of a Trade Union.

In 1844, the Trustees of the British Museum, who had appointed Mr. Hawkins to accompany Mr. (afterwards Sir Charles) Fellows on an expedition to Asia Minor, applied to the Council of the Institute for suggestions, which might guide that gentleman in his antiquarian researches. A paper of instructions was accordingly drawn up indicating the points most worthy of the travellers' attention during their tour. It is only a few years since the same advice was sought and rendered in reference to the Palestine Exploration Scheme, and it is gratifying to note these early and recent instances in which the Institute has helped to promote a national object.

The aspect of modern London up to this time, had been one little worthy of this rich and ancient capital. But a marked attempt was at length made to improve its street architecture, and the club houses which rose one after another in Pall-mall represented, in spite of certain defects, an effort in the right direction. That the standard of metropolitan splendour was not over-ambitious, may be gathered from the fact that in 1845, the Council, while congratulating the Institute on the completion of Trafalgar-square, "with its terraces, flight of steps, fountains, basins, and triumphal column," expressed their opinion that "a feeling had arisen in the public for rich and effective combinations of objects of a monumental character." The Thames Embankment was a scheme still *in nubibus*, but the subject had been brought under the notice of a Parliamentary Commission in connexion with other plans for metropolitan improvement.*

Infirmary Buildings for the St. Olave's Union.—The whole of the blinds for this building were supplied by Messrs. Guynan & Son, of the Oxford Steam Works.

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* The first number of the *Builder* appeared in 1842; the *Building News* in 1855; the *Architect* in 1869.

* The conclusion in our next.

ARTISANS' AND LABOURERS' DWELLINGS IMPROVEMENT ACT.

BY MR. G. VULLIAMY.

THE evils to be modified by this statute are the result of causes operating through many generations, and presented to us now, in the words of the preamble, as arising from densely inhabited buildings in courts and alleys, in many cities and boroughs, which, by reason of the want of light, air, and ventilation, or of proper conveniences, or from other causes, are unfit for human habitation, and fevers and diseases are constantly generated there, causing death and loss of health, not only in the courts and alleys, but also in other parts of such cities and boroughs.

These evils were found to be aggravated by the fact that the houses, courts, and alleys were the property of several owners, and it was not in the power of any one owner to make such alterations as were necessary for the public health. It was, therefore, deemed expedient to obtain power to pull down houses and reconstruct portions of the localities, and to make provisions for dwellings for the working class who might be displaced in consequence thereof.

The Act became law on the 29th of June, 1875, and its object is to provide more healthy dwellings in densely-inhabited localities.

[Mr. Vulliamy here gave a digest of the provisions of the Act.]

Proceedings under the Act.

The first official representation under the Act in the metropolis was received from the medical officer of health for the Holborn district, and the next related to certain courts and places in Whitechapel and Limehouse. These documents were received in time to permit the preliminary inquiries to be made prior to the time when the schemes had to be prepared and publicly notified. Schemes were accordingly prepared in November, 1875, by order of the Metropolitan Board, by Sir Joseph Bazalgette and myself, and have since been laid before the Secretary of State, and a commissioner has investigated them by his directions.

Holborn Scheme.

The representation for this scheme showed a number of densely-crowded courts and alleys eastward of Gray's-inn-lane, and bounded by Portpool-lane, Leather-lane, and Greville-street, &c. In that locality were found many houses unfit for human habitation; and diseases indicating a low state of health amongst the population were from time to time prevalent, and attributable to the closeness and narrowness of the courts, and to the bad arrangement and condition of the houses; also to the want of light, air, and ventilation, and proper conveniences in such houses.

The scheme proposed to improve the district by erecting upon the four acres of land constituting the improvement area, eighteen blocks, containing various superficial areas, the whole giving a total of 67,250 ft. Besides, one acre and a half out of the four acres are devoted to roads. Each block is to be five stories in height, and each story not less than 8 ft. in height in the clear. The blocks are to be so constructed as to contain in the aggregate not less than 950 tenements, which are to be composed of not less than:—

650 tenements of one room, each tenement containing a clear area of not less than 140 ft.

250 tenements of two rooms, each tenement containing a clear area of not less than 250 ft.

50 tenements of three rooms, each tenement containing an aggregate clear area of not less than 350 feet, and affording accommodation for not less than 3,500 persons, or about 70 persons more than the estimated number of the working-class which will be displaced.

Each block will be furnished with water-closets, sinks with water supply, and dust-shoots, according to the number and size of the tenements in such block. The old buildings will be taken down and removed in sections of buildings, and new buildings upon the lands erected according to regulations to be made by the Board with the approval of the Secretary of State. New streets are to be formed of the respective widths of 40 ft., 35 ft., and 30 ft. for carriage traffic, and two footways of 25 ft. wide.

The estimate required by the statute states:—

Cost of land	£103,000
Cost of roads and sewers, and incidental works	10,000
	113,000
Less recoupment	44,000
Net cost	£69,000

Whitechapel and Limehouse Scheme.

The representations from these localities relate to certain streets eastward of the Royal Mint, and abutting on Upper East Smithfield on the south, and Royal Mint-street on the north. The Great Eastern Railway Viaduct intersects the district. Only a small portion is in Limehouse district and Wapping parish.

Upon the improvement area twenty-two blocks of dwellings are to be placed with paved courts and streets alternating. The whole blocks will have a total superficial area of 92,488 ft., subject to similar conditions as in the first scheme, but the tenements would amount to 1,077, and the persons accommodated to 3,600.

The estimate of cost is:—

For land	£100,000
Road, sewers, and incidental works	10,500
	110,500
Less recoupment	56,100
Net cost	£54,400

Other Schemes.

These have to be dealt with previously to the session of 1877, and relate to the following localities:—St. Marylebone, Lisson-grove and near Edgware-road; St. George-in-the-East, various courts and alleys; St. George the Martyr, Southwark, unhealthy courts, &c., shown on plan; Whitechapel, Goulston-street, &c.; St. Martin-in-the-Fields, Bedfordbury, &c.; Clerkenwell, alleys, &c., Turnmill-street; Bermondsey, Crosby-row, &c. These, however, are only to be taken as samples of the deplorably neglected spots and "rookeries of the metropolis."

Many able men have laboured to bring under notice of Parliament and the public the want of proper dwelling-places for the hard-working labourer. In the foremost rank we may name Mr. George Godwin, F.R.S., architect, and editor of the *Builder*; also Mr. Thomas Beams, in 1851–2 preacher at St. James's, Westminster, during the time of the cholera, who wrote a useful book on "The Rookeries of London"; Mr. Henry Roberts, F.S.A., whose book in 1867, on "The Dwellings of the Labouring Classes," under the "Society for Improving the Condition of the Labouring Classes, &c.," gave plans and descriptions of what had been done at that date. There is also the book written as a prize essay, in 1864–6, by Mr. James Hole, of Leeds, on the "Homes of the Working Classes," which preceded the formation of Sir Sydney Waterlow's Company for Improving Industrial Dwellings. This Company was greatly aided in its first undertakings by the practical skill of Mr. Matthew Allen, of Tabernacle-walk, a builder and inventor of artificial stone, which has tended greatly to many economical and fire-preventing arrangements in such dwellings. His suggestions with reference to the construction of buildings under the new Act have been highly esteemed, and are explained in a pamphlet which he has circulated. A company has also been formed, under good auspices and with large capital, for the improvement of unhealthy localities under the statute, Mr. C. Barry, the president of this Institute, being the architect of it.

The Peabody Trustees Fund and Buildings being intended for a better class of artisans than are to be benefited by the clearances to be effected under the new statute, it is not perhaps needful now to allude to them, though highly beneficial as an example of well-directed acts of benevolence supported by practical action.

Previous Legislation.

It may be desirable to notice that the General Paving Act of 1817 made provision for closing unwholesome alleys by owners, and enacted a legal machinery by which any difficulties of title might be removed; but there were no means of compulsion indicated, and the health laws were not then studied or understood as they have been since epidemics tended to stir up men's thoughts in the right direction.

In 1868 the "Artisans and Labourers' Dwellings Act" was passed, and in the House of Lords changes were made in its clauses which placed the executive in the power of the Vestries and District Boards instead of the Metropolitan Board, and coupled with an impracticable restriction as to making a special rate. This has rendered the Act nearly inoperative, as shown by a return made to the House in 1875.

In several instances also the Legislature has required that when powers are granted for metropolitan improvements (see Improvements Act, 1872–3), sites for artisans' dwellings shall be provided at a moderate cost, and thus facilities for such structures have been obtained. The promotion of such works are also greatly aided by the recent arrangements for loans at easy interest from the public commissioners.

IMPROVED DWELLINGS FOR THE WORKING CLASSES.

BY MR. FRED. CHANCELLOR.

THE subject of improved dwellings for the working classes is so extensive that when I heard the time to be allotted to each paper was not to exceed a quarter of an hour, I felt it was almost useless to attempt to compress all that could be said upon the matter into that short space of time; but upon consideration I came to the conclusion that this was a wise arrangement, as it would necessarily compel each of us to select one of the many points worthy of consideration in connexion with the subject. The branch of the subject, therefore, which I propose to discuss is the planning and arrangement of improved dwellings in towns. And in discussing this matter, I am very desirous of avoiding any appearance of being dogmatic. I feel that it is a subject about which we all have a good deal to learn, and if I have ventured to take a prominent part in to-day's business, it is not because I feel I am able to teach my brother practitioners anything, but because I think it is wholesome to propound the ideas that occur to one in order that they may be discussed and criticised and reduced to their true value.

The planning and arrangement of improved dwellings seem to divide themselves naturally into two heads:—

1. The general arrangement of the blocks of buildings; and

2. The particular arrangement of each dwelling.

I found when I first took up the matter that there were, as regards the first head, two arrangements upon which the improved dwellings were being generally erected.

By the first plan an inclosed or partially inclosed staircase from top to bottom generally in front gives access on each landing to two dwellings.

By the second plan, which is generally known as the gallery plan, one staircase usually at the end of each block gives access to external galleries, to each floor, by which the dwellings are approached.

In preparing the plans for the buildings in the Farringdon-road, for the Metropolitan Association for Improving the Dwellings of the Industrious Classes, it seemed to me that there were objections to the first arrangement, inasmuch as the staircase was confined, and that the number of them was necessarily multiplied, and that they interfered very much with the general plan of each dwelling. And I also felt that there were objections to the second or gallery plan, namely, that the privacy of each dwelling was much interfered with, if not altogether destroyed, by the gallery forming a common passage-way to each dwelling, and so enabling every passer-by to overlook the rooms of each dwelling. It was also evident that the galleries very materially interfered with the access of light to those rooms opening on to them. It was a consideration of the objections to these two arrangements which led me, in designing the Farringdon-road buildings, to devise a plan which should embody the conveniences without the inconveniences of the two plans I have described. I have ventured to call it the Balcony plan.

By this arrangement staircase accommodation is economised, as compared with No. 1 arrangement, inasmuch as I get one staircase to four dwellings on each floor; and it possesses an advantage over No. 2 arrangement, inasmuch as absolute privacy is obtained for each dwelling, and the interference with light to the principal rooms caused by projecting galleries is avoided.

It affords also what I would submit is a

desideratum, a kind of balcony completely private to each pair of dwellings, which affords a very convenient arrangement for the cultivation of flowers. And may I here digress for a few moments to say how very much, I think, we are indebted to those good people who are endeavouring to cultivate a fondness for flowers amongst our working classes? I do not believe that a man who is fond of his flowers could ever thrash his wife, or that a wife who takes a pride in her flowers will ever have a slovenly and untidy dwelling.

Minor advantages of these balconies are that they afford recreation-grounds, although limited in extent, to the small child not old enough to be trusted away from the mother's sight, and I believe that they afford pleasant and airy look-outs of a summer's evening. It will also be observed that, as the staircases are open throughout, the circulation of air all round the buildings is certainly facilitated. There are other advantages which, I think, will commend themselves, namely, increased facilities for escape in case of fire, and also greater isolation. You will observe that the blocks of dwellings in Farringdon-road are really divided into three blocks each, the staircases almost destroying the possibility of the spread of any fire occurring in any one section.

I venture also to submit that by adopting the arrangement I have at Farringdon-road, I have economised space and ground-rent, and have been able to obtain a larger number of dwellings upon a given space than by adopting the ordinary plan of one range of buildings facing the road. And I obtain this further advantage that I give to each dwelling a fair average view, whereas, had I adopted the other plan, all the dwellings on one side would have had a pleasant lookout to the road, whereas the others would have had but a blank look-out into the yard below.

I now approach the second part of my subject,—the particular arrangement of each dwelling.

It cannot be denied that we English are, from the highest to the lowest, exclusive in our habits. What we have we like to have to ourselves, and there is an indisposition to hold things in common one with another; and I think I may say that this feeling is quite as strong, if not stronger, amongst the working classes than it is amongst those in the upper classes, and a somewhat extensive experience in connexion with the dwellings of the working classes has satisfied me that no arrangement is complete which does not give to each tenant all he requires exclusively. A washhouse or a closet held in common by two or three families is a constant source of quarrelling and illwill; and I would therefore insist upon this rule, that no arrangement of plan is thoroughly satisfactory which is not completely self-contained. In other words, that whatever the accommodation provided, the separate scullery and the separate water-closet should always form a part of it. More especially would I emphasise the importance of the separate water-closets, because I do believe that the loss of modesty and self-respect may in countless cases be first traced to the necessity of using in common one closet by two or more families.

Another point which I consider of importance is the position of the water-closets. It should always be approached from a lobby or passage, and should never be entered direct from any apartment. In the economy of space forced upon us by the money part of the question, it is no doubt difficult to arrange this point, but I should not hesitate to make a very considerable sacrifice in order to attain it.

Then, again, there is the question of extent of accommodation to be given in each dwelling. Those of us who have anything to do with the erection of cottages in the country must have been over and over again reminded of the necessity of always providing living-room, kitchen, or scullery, and three bedrooms; and I should be afraid to contemplate my fate were I now to submit to public criticism any plans of cottages which did not embody this accommodation at the least; but when we get to London, we find a different state of things, and I have with a calm conscience (and I am here to tell the tale) not only planned but erected several dwellings with but one room besides the scullery. No doubt the dense population of London justifies us in planning and building dwellings with limited accommodation,—I should, perhaps, say with especially limited accommodation, — whereas the sparse population of most country districts almost compels the erection of cottages which shall be suitable not only for the man and his wife, but also for the man and his wife and his grown-up sons and daughters. Still, I cannot but think that this iron rule of three bedrooms might in many instances be modified, and I believe will be modified, because I think our agriculturists, whether landlords or tenants, are becoming impressed with the fact that one of the best ways of preventing agricultural strikes is to provide good cottages for the labourers, and by good cottages I mean cottages suitable for different sized families.

A labourer will pause before he joins in a strike if he knows the penalty will be the loss of his good cottage; and if he is insensible to it, his wife will put before him such reasons as will in most cases shake his resolution. But I am somewhat digressing, and must return to my text, namely, the particular arrangement of each dwelling.

I have suggested that each dwelling should be self-contained, and that dwellings affording a variety of accommodation are advisable and necessary.

These were the general principles laid down and approved by the directors of the Metropolitan Association for planning the new buildings in the Farringdon-road, and in order more clearly to put before you the variations in the accommodation offered, I have prepared a large plan, showing three different classes of dwellings.

No. 1 is the smallest arrangement, and includes a living-room, with bed-recess; but this dwelling has a separate scullery, fitted with small range, copper, sink, coal-box, and pantry, and also a separate water-closet.

No. 2 includes living-room, with bed-recess and one bedroom, also with its distinct scullery, with fittings as before, and distinct water-closet.

No. 3 includes living-room, and two bedrooms, with scullery and water-closet as before.

You will see by these plans that each dwelling is complete in itself when the front door is shut, the only convenience used in common being the dust-shaft.

Of course these arrangements might be amplified to almost any extent, and, indeed, in one block there is a somewhat larger arrangement; but these plans are sufficient to show the principle which has been acted upon, and which I cannot too forcibly impress upon you, namely, that each dwelling, however limited in accommodation, should have all its domestic offices as complete as the one with a larger number of rooms.

In concluding these observations, I feel some apology is due for obtruding upon your notice the new buildings in the Farringdon-road. They were, however, built, both in block and in detail, upon the principles which I have endeavoured (I am afraid, however, in a very halting manner) to lay before you, and therefore seemed to be the most fit to illustrate my observations upon the subject. In working out those principles, and, indeed, I may say, in arriving at the principles themselves, I was most materially assisted by my good friend, Mr. Charles Gatliff, the untiring secretary of the Metropolitan Association, and who, from having been one of the pioneers in this movement, has accreted a large amount of experience, and a great mass of facts, all of which were most cheerfully placed at my disposal, and without which, I need scarcely say, I should not have been here to-day.

ON GREEK ART AS ILLUSTRATED BY ITS MONUMENTS.

BY MR. R. P. PULLAN.

IN former days,—I am speaking of no very remote period,—when Goth met Greek, "then came the tug of war;" architects were divided into two distinct and hostile camps; the Classicist and Mediævalist looked upon one another as sworn foes, and contended with one another on every public occasion. They even invented mutual terms of contempt: one party stigmatised its opponents as Pagan, the other retorted by the inelegant appellation of Mid-devil. Now, however, happily we have changed all this; we have concluded a truce, and champions amongst the Goths walk into the tents of the Greeks and prove their armour. The fact is, that our views on matters connected with our art have become broader and more liberal; we have found out by investigation that the principles of all true art were the same at all periods,—in short, that the fundamental principle of all good architecture was the common-sense one of employing the best construction that the materials at the disposal of the architect and his knowledge of construction permitted, and of decorating the constructive features in the most appropriate manner.

This principle was common to the only two pure styles, the Greek and the Gothic, though the results differed widely; because the conditions under which the architect worked were so entirely dissimilar. The Greek, having no knowledge of the arch, hewed immense blocks from the sides of the marble mountains around him. Some of these he laid side by side in rocky beds hollowed and levelled to receive them, united them with clamps so as to form a foundation as massive as the rock on which he built,—immovable even by earthquakes. This was the case at Priene, Halicarnassus, Cnidus, and elsewhere. Upon these he laid slabs of finer marble for his steps and pavements, and, with carefully worked blocks, he raised the walls of his cella; and then, as in his sunny climate shade was the great desideratum, he surrounded the cella with porticoes and colonnades. Upon the columns he placed massive architraves and cross beams, tying the whole together. The frieze was generally formed of thin slabs connected with cramps, and left for the sculptured decoration. This ornamental work was protected by a cornice, with sufficient projection to throw off the water through antefixæ placed at regular intervals, the whole being arranged according to certain laws of proportion. The architect then called in the sculptor, who began at the top of the building and worked downwards. My reason for thinking that generally the work was erected in block and finished afterwards is, because in the Mausoleum, and the temple at Priene, portions of the ornamental work have been left unfinished, and in the Temple of Apollo Branchidæ there is a column still standing which has never been fluted. When the sculptor had adorned the friezes, metopes, and, as in the Temple of Diana at Ephesus, even the columns with figures, the painter illuminated the whole with gold, red, blue, and other brilliant colours, so that when the temple was completed it was a perfect work of art.

The Mediæval architect having, as a rule, smaller stones to work with, understanding thoroughly the capabilities of the arch, and possessing a perfect knowledge of the proper ratio between bases of support and superincumbent weight, piled arch upon arch and pier upon pier, causing his building to spurn the earth and aspire to the skies, and thus constructed lofty vaults on comparatively slender columns, and erected spires which pierced the clouds on comparatively thin walls. At Salisbury, the wall of the tower is in some places not more than 3 ft. thick. He, too, designed his cathedrals according to certain rules of proportion, and decorated them with painting and sculpture, so that his building also was a perfect work of art. Therefore, the Greek and the Goth have no cause to despise and revile one another, seeing that the principles of their styles are identical. They have learned to look on both sides of the shield, and to own that each has excellences peculiarly its own, and that they are united by a common basis.

But my object is chiefly to point out certain qualities which are often denied to Greek architecture, but which it shares equally with the Gothic, and which no one who has studied its monuments *in situ* will deny that it possesses. These are grandeur, refinement, picturesque beauty with regard to its surroundings, and ingenious construction. Unfortunately, none of the greatest temples are still standing. There are, however, sufficient remains of one still in existence to assert its former grandeur. On the promontory of Poseidon, not far from Miletus, there are three columns standing, 63 ft. in height, portions of the walls of a cella built of blocks, generally 6 ft. in length; capitals of pilasters measuring about 6 ft. each way. The building was above 300 ft. in length by more than 160 ft. in width, with ten columns to the front porticos, and a double row of columns,—106 in number,—surrounding it. Such a building as this, which was 100 ft. in height (without reckoning the podium lately discovered by a French expedition, under MM. Riyat and Thomas), surrounded by a forest of columns, and approached through an avenue of seated figures and sphinxes (some of which are now to be seen in the British Museum), must have possessed a grandeur approaching the sublime, quite equal to that of any Gothic cathedral.

I next have to speak of refinement as evidenced by exquisite proportion, subtle contrivances to improve the optical effect, and the beauty and variety of curves of mouldings, which were varied to suit their respective positions.

The system of proportion employed by Greek architects has been thoroughly explained in a treatise by Mr. Watkiss Lloyd, contained in Professor Cockerell's fine work on "Ægina and Bassæ," and it is a remarkable fact that for the most part the three temples which I excavated were found, upon a comparison of the various dimensions, to bear out his theory as regards both plans and elevations. That special refinements were used in the Parthenon no one who has read Mr. Penrose's learned work on that building can doubt. He therein proves satisfactorily that there was not a straight line in the building, and although the remains of the Temple of Priene were not in a sufficiently perfect condition to allow me to affirm the same with regard to it, I was able to note the fact that the walls of the cella battered, that the pavement of the peristyle sloped, and that the faces of the steps, the architrave, and corona of the cornices were none of them exactly vertical. These observations were made by the use of a level and plumb-line, with offsets taken at regular intervals. At a former Conference I had occasion to mention the variety of curves found in Greek mouldings, — the beauty of their contours, and their suitableness to their various positions. Thus, in each of these particulars there was a degree of refinement which is not equalled in any building of the Mediæval styles.

Of the picturesque arrangement of Greek buildings you have lately been able to judge from the drawings which illustrated Mr. Fergusson's interesting paper on the Erechtheum, and neighbouring structures on the Acropolis of Athens, and by some of the photographs on the walls. The bold crag, with the propylæa, the temple of Victory jutting out at the side, the elegant group of the Erechtheum on one side, and the Parthenon crowning the height, form a picture nowhere surpassed. This I have before described, but I shall mention another group of sacred edifices, which was but second to this, that of the temenos of the Temple of Minerva Polias at Priene. It was seated on a vast platform of masonry at the foot of a tremendous precipice, upon which stood the Acropolis. The temenos was entered by a sloping road through propylæa, having a small temple with four columns on each front, not quite in the centre of the east side. On entering, the temple was seen on the right, the view of it partly concealed by a large heroön, ornamented with sculptured friezes; on the left there was a long Doric colonnade overlooking the sea, and about the enclosure, which probably was planted with trees, were placed seats of various forms, and pedestals with statues. Thus, there was no formality, but an arrangement that was pre-eminently picturesque, whether seen from the agora below or from the level of the temple itself.

That the Greeks showed a certain degree of ingenuity in construction is evident from two buildings,—not temples,—in which there was a departure from the usual form: these are the Lion Tomb at Cnidus and the Mausoleum of Halicarnassus. In both there were the same conditions to be fulfilled, viz., how to support a pyramid,—the emblem of eternal repose,—over a circular chamber at a time when the arch and dome with voussoirs were not known. The problem was solved in both cases by the use of the *tholus*, or vault in the shape of a beehive, consisting of a series of corbels arranged on a circular plan, and united at the summit by a huge keystone, in shape like the bung of a beer-barrel. This *tholus* was used in the Treasury of Atreus of Mycene, and I am able to illustrate it by a drawing that Professor Donaldson has kindly lent me for this occasion. The vault of the Lion Tomb was found partly in existence, and as this monument and the Mausoleum were not twenty miles apart, it is probable that one was imitated from the other. It is supposed that the Lion Tomb was erected B.C. 394, and that it was the prototype of the Mausoleum. This system of corbelling was also probably used to form a relieving arch over the beams at the fronts of the Mausoleum, which were more than 16 ft. in length, and which could not, without some such contrivance, have supported the superincumbent weight of the pyramid. So that, you see, that even when unusual construction was required the Greek architect was equal to the occasion.

Will you pardon a digression while I mention a curious circumstance connected with the *tholus*? When at Rome two years ago I visited the so-called Prison of St. Peter, which consists of two subterranean chambers under the Church of San Giuseppe, in Falegnami. When I reached the lower of these I found myself, to my great surprise, in the lower part of a *tholus*. Five or six courses were *in situ*, projecting gradually one above another, and pointing to a regular centre. Here, then, was the oldest building in Rome,—an Etruscan treasury or sepulchre, evidently imported from Asia Minor, and clearly proving the Asiatic origin of the first colonists.

To return to the subject of Greek art. I have endeavoured briefly to show that there are certain qualities in Greek architecture which are peculiarly its own, worthy our study and imitation. By imitation I do not for a moment mean copyism; in fact, it was the copyism of Greek buildings by our predecessors which brought Classic art into that disrepute from which it is happily becoming free. Doric façades of engaged columns, with rows of windows between them, for churches and chapels, and gigantic propylæa for gateways to railway stations conveyed false impressions of the qualities of Greek art. Now, however, we are beginning to realise the fact that such qualities as grandeur, good proportion, refinement of mouldings, and picturesque arrangement were amongst its characteristics; to allow that, whether we make use of the Classic or Pointed styles, these qualities are essential to good architecture, and to perceive that if we invent a style of our own,—an architecture of the future,—it ought, in a great measure, to be based upon principles that comprehend these characteristics of Greek art.

M. VIOLLET-LE-DUC'S LECTURES ON ARCHITECTURE.

In the author's preface to these lectures,* which are given to the English public by the same translator who has already done good service in making other works of M. Viollet-le-Duc better known on this side of the Channel, he tells us that some time previously to 1860 he had determined on opening a studio for pupils, and delivering a course of lectures on architecture. The proposition appeared to him to have no particular interest except for those who should wish to frequent the studio and attend the lectures. Not, however, belonging to any school, the intending lecturer found himself and his undertaking strenuously opposed by the representatives of the orthodox schools of architectural instruction in France, as a man of "dangerous" dogmas. "My friends began to intimate a general rising in arms,—a fierce impending conflict; and both sides were hoping for a goodly sight of broken lances. Now tumult is the foe of study, and I love study and detest tumult. I therefore allowed the storm to blow over; which, meeting no resistance, spent its rage in vain. I put the manuscript of my lectures back into my portfolio, and gave my mind to other matters." Although thinking that there was no good to be got out of controversy, M. Viollet-le-Duc nevertheless believed that his lectures contained a statement of truths and principles which it was worth while to invite more attention to, and hence the subsequent publication of these undelivered lectures, the object of which is to inquire the reason of every form of architecture, —"for every architectural form has its reason,"— and to point out the principles which underlie them, and trace the logical consequence of those principles, independently of the ideas or tendencies of any special school of criticism.

The most important of the lectures in the first volume is certainly the opening one, which contains a good deal that is not only in a great measure special to the writer, but is put in an original and thoughtful manner. The great point of the author, as stated in this first lecture, is, that art is always the same in its essence and its principles, and that it is independent of the element in which it originates and flourishes. The frequent division of the history of art into periods of splendour and periods of barbarism conveys, therefore, a false impression. A people who are, in some senses of the word, barbarous, may possess arts in great perfection; and Art cannot be barbarous, for the simple reason that it is Art. "It is really barbarous only in ceasing to be art; when it degrades itself by belying and violating its own principles; when it slavishly follows the caprices of that fantastical queen we call Fashion; when it becomes the plaything of a people without fixed ideas or convictions; and when, no longer reflecting national manners and customs, it is but an encumbrance,—a thing of mere curiosity or luxury." Such a state of things, however, may exist, does exist, as we know, in conjunction with a period of great social refinement and luxury, and great scientific knowledge; a sufficient indication, if any were necessary, that art is independent of scientific knowledge, and of what we may term "material civilisation," or mere luxury and completeness in the organisation of daily life, in opposition to intellectual civilisation. Then comes the question, what is this existence, this power, which we call "Art," and which is, in a sense, eternal and unchangeable in its essence. The remarks of M. V. Le Duc, in regard to this consideration, are most admirable; but either he or his translator does not make quite clear, what is certainly the fact, that they are applied to two different phases or sides of the subject; to the means of expression in art, and to the feeling or impulse which underlies and prompts the expression. Both these are spoken of as "art," but they ought certainly to be distinguished from one another more carefully. In regard to the origin of art, regarded as a means of expression, we shall not follow our author into details. His attempt to trace out the probable first beginning of artistic expression, in a rude form, is what has been done often enough before, though he does it remarkably well. His description of the process by which sculpture may have come into us as a means of expression is very logically put forth. A strong man of some ancient tribe kills a lion, and hangs the skin over his dwelling as a trophy; this trophy is perishable or decays, and he cuts as well as he can a less perishable representation in the rock, and to all who see this image it plainly says,— "This is the strong man who knows how to defend himself and his"; and when he dies his family hew out a cell in the rock as a sepulchre, and over it carve a man fighting with a lion, the figure of the man large, and that of the lion small, to indicate the might and power of the hero; for though it would really be a greater feat for a small man to kill a large animal, that is a complex idea which does not enter into the mind of the primitive artist. But this is the first and simplest form of artistic expression by means of sculpture; and in a similar manner the author illustrates the essential idea which gives rise to shades of expression in sound and modulation which finally develop into music.* But all this, though, as we have observed, very well put by the author, is only a repetition of a kind of imaginative conjecture which we have often met with before, and which, though always interesting and even fascinating to the mind, partakes too much of mere conjecture and fancy to lead to any very valuable result.

It is rather to our author's remarks upon the underlying impulse which gives rise to artistic expression that we would draw attention, the rather because the view which he emphasises is one which has not been nearly enough taken into account by the profession which he represents and which he addresses. Taking as the keynote of his discourse the axiom that "Art is an instinct, a craving of the mind, which, in order to express itself, employs various forms: but Art is unique, as Reason, Wisdom, Passion, are unique,"—he points out how a similar train of emotion may be aroused by expressions the most distinct from one another and from nature.

> "It would even appear that the farther the arts are removed from the imitation of nature, the more they are calculated to strike certain deep-seated chords in the soul, leaving a profound and lasting impression. The accent and action of an orator, a mere gesture, a musical phrase, or the sight of a noble building, will often produce such a perturbation of the nerves that tears start to the eyes, and we experience a sensation of heat or cold; though we are unable to describe the nature of the feeling which moves us. This feeling is our artistic instinct, which is touched by some one of the various expressions of art."

And if we analyse this feeling (so far at least as it is capable of analysis) we may perceive that "natural phenomena produce in our minds, through the senses, certain impressions which are essential to our nature, and are independent of physical fact." The roaring of the sea is but a sound of which we know the cause, but this grand harmony develops in our minds certain feelings which are already there in a latent state. "Now let us suppose that art, speaking the language of the musician, recals to you the harmony of the waves,—in an instant your mind is again filled with the same thoughts which

* Lectures on Architecture: translated from the French of Viollet-le-Duc, by Benjamin Bucknall, architect. Part I. (Sampson Low & Co.).

* It is noticeable that the manner in which this origin of music by Viollet-le-Duc is put strongly coincides with that suggested by Darwin, we forget at this moment in which of his works.

occupied it when you were on the sea-shore. . . . Suppose, again, that during those hours passed in listening to the waves, you were under the influence of some happy or some sorrowful event; the same feeling of joy or sorrow which you then experienced will be awakened by the musician." But has the architect a similar power to this of touching the heart and working upon the imagination? Yes,—according to Viollet-le-Duc. "If he (the architect) traces beneath the sky a long horizontal line along which your eyes may range without interruption, your mind will be affected by a sense of grandeur,—of calm,—which will arouse in it ideas analogous to those caused by the sounds of the sea, of which we have just been speaking." Or, again,—

"Take a person into a low far-stretching crypt, arched upon numerous short and massive pillars; although he can walk erect and breathe with ease, he will incline his head, and none but melancholy thoughts and gloomy images will present themselves to his mind; he will experience a sense of oppression, a longing for light and air. But take him into a building vaulted at a lofty height and flooded with light and air; he will direct his gaze upwards, and his face will reflect the feelings of grandeur which crowd into his mind. This is a phenomenon which any one may observe. . . . . Thus, then, long horizontal lines, low or lofty ceilings, a dark or a brilliantly-lighted chamber, will give rise in the soul to emotions of a widely different nature. This is natural and evident; all can understand it. But the human mind is complex; and by means of a deep-seated faculty, the workings of which we cannot comprehend, it establishes certain relations between sights, sounds, and ideas, which, however wonderful, are none the less real; since we find them recognised by all the individuals who compose a crowd at the same place and at the same moment. Thus (for we must reason familiarly if we would be understood), why, in music, does the *minor key* awaken in the mind different ideas from the *major*? It may be said that there is a *minor* and a *major* in all the arts, as also in the infinite details which constitute each of them severally."

These certainly are considerations which there is great hazard in committing to language or to print too formally and in detail, since they express truths which, though real (as all who can feel them know), are so broad, and vague, and (if we may use the term) spiritual in their signification, that an attempt at a logical statement almost tends to destroy them, for the moment, in the process. But one of the conclusions drawn by the author from these considerations, as applied to his special subject, cannot be passed over, and is stated in so uncompromising a manner as would rather startle, we imagine, a good many respectable "practitioners." "An artistic people," concludes our author, "is one which has equally understood all the different languages of art. An architect who can listen to a melody or a poem, or view a sculpture or a painting, without experiencing emotions as lively as those he would feel in viewing a building, *is not an artist*, but a mere practitioner; the same may be said of the musician, the poet, the painter, and the sculptor." This, we say, is a judgment calculated to startle not a little those practical members of the profession whose ideas and associations never travel beyond drawing-boards and estimates and specifications. But is it not true? And is not here the secret of a great deal of the false taste, the sentiment, and superficiality of the day,—that the building and its decoration are *not* the result of any innate feeling prompting the designer towards expression through form and mass and colour, but merely a contrived repetition of what in some former day did spring from an innate impulse, and was then and therefore genuine and impressive, whereas its reproduction or imitation at the bidding of a modern art-fashion, is something merely hollow and unreal? It is not to be supposed that a true artist must necessarily have the power of expressing himself equally well in every medium, because the manipulation of each form of expression, so as to produce the best and strongest effect, and to speak the finest language it is capable of, is in itself a matter often for lifelong study; though we need hardly remind the reader that a certain universality of power in production has characterised some of the greatest artists, and all the greatest epochs of art. But that this faculty of seeing in all the arts the various expression of the same latent emotion, of enjoying and understanding them all equally, is a most important test of real artistic feeling, we do as strongly believe, as we are only too certain that it is one rarely met with in the present day, and we are almost inclined to say most rarely among professed artists. Too often the painter is a mere painter, the musician a mere music-maker, the architect a mere builder of houses; and highly as we have long estimated the genius and the writings of M. Viollet-le-Duc, we gain a new respect for his genius, and a new proof of its reality, on finding that with all his multiform labours and industry in the field of art which he has chosen for himself, he has preserved so clearly and strongly this view of art as a whole, and has not been tempted to restrict his mind and his appreciation to the one form of its expression which he has specially cultivated. It is no doubt true that all cannot feel or appreciate this metaphysical unity of the arts, and to those who are debarred by nature from seeing it, education will, we suspect, do little or nothing to develop the faculty. They are in reality "art blind"; they can be conscious of the external form of art expression as a physical fact, but not of its inner meaning. How intense is this perception of the interchangeable nature of different forms of art, in delicately-organised minds, and how little education has to do with it, is illustrated by an anecdote of his childhood, which Viollet-le-Duc repeats in connexion with this subject, and which is too curious and suggestive to be omitted. He was taken by an old servant one day to the Church of Notre Dame:—

"He carried me in his arms, for the crowd was great. The cathedral was hung with black. My gaze rested on the painted glass of the southern rose-window, through which the rays of the sun were streaming, coloured with the most brilliant hues. I still see the place where our progress was interrupted by the crowd. All at once the roll of the great organ was heard; but for me the sound was the singing of the rose-window before me. In vain did my old guide attempt to undeceive me; the impression became more and more vivid, until my imagination led me to believe that such or such panes of glass emitted grave and solemn sounds, while others produced shriller and more piercing tones; so that at last my terror became so intense that he was obliged to take me out. It is not education which produces in us this intimate connexion between the different expressions of art."

Considerations of space warn us that we must not here dwell longer on this remarkable introductory chapter, the perusal of which we commend to every thoughtful man interested in art as a whole (as every thoughtful man ought to be) or in the arts, as separate means of expression. There are those, no doubt, who will say that these thoughts have little to do with architecture. But then they are not the people for whom the introductory lecture was written. We must now say a word, though it can be but briefly, as to some other special points of the lectures included in this first volume. The second lecture, after some remarks on the buildings of primitive times, gives a brief review of architectural art as it existed among the Greeks, in the course of which the author gives very good and sufficient reasons for his non-adherence to the theory of the wooden origin of the Doric style, a theory not now enjoying such respectable patronage as formerly, but which has not often been so well and logically refuted as in this lecture. The comparison between the details of the Parthenon and those of the Lycian rock-cut tomb in the British Museum, with its genuine timber details, forms an important point of the argument. The construction and relation of parts in the Doric order is illustrated by a fine drawing in that half section, half perspective manner which some of the French architects are so fond of, and use so ably, in illustration. The whole of this account or analysis of the Doric style, and its logical process of development from one detail to another, should be read with attention; as also the remarks upon the line of demarcation between Greek and Roman art, which exhibit that remarkable universality of view which so distinguishes M. Le Duc among writers on architecture. Some observations on the modern style of cities we may quote:—

"We call ourselves a civilised people; yet what, for the most part, are our cities, and what in a few centuries will they become, when in all probability the vulgar regard for the satisfaction of material requirements will have utterly swept away the few remaining relics of former ages? What are the cities of the new world? And what the great manufacturing towns of England? That which we call civilisation has led us in the nineteenth century to make wide streets, and to line them with houses of uniform appearance. Our towns and cities have thus become deserts for thought; they have the wearisome monotony of solitude without its grandeur. What is there throughout these vast chessboards of streets to suggest historical associations? Where is there a centre of repose for the distracted mind of the spectator? On what point shall his attention be fixed? Where does he find the indication that a hundred generations have trodden the same ground before him? Not, indeed that I regret the fetid and tortuous streets of our old towns, with their houses seemingly brought together haphazard, their labyrinths of alleys, their public buildings obscured by booths and disfigured by dirt,—accumulation without order,—an indescribable chaos; yet in this chaos there was, at any rate, the imprint of man, of his labour,—the memorials of his history,—something more than the indications of the merely material interests of his time."

The comparison between Greek and Roman architecture is carried out further in Lecture III. This is summed up in the comparison of Greek architecture to the perfect nude human figure, which is beautiful because every part of the exterior is the natural consequence of its organic structure; whereas Roman architecture is the man dressed, in a dress which may be very effective, very rich, very handsome, and so on, but which we feel to be almost entirely arbitrary in its form and detail, not the necessary consequence and expression of the body which it clothes. This criticism might, *à fortiori*, be applied to the architecture (so called) of modern engineers, who cannot be content with leaving the naked forms of their construction, which would often be beautiful, and always interesting, but must dress them in an arbitrary architectural (so-called again) clothing, often ugly, and always uninteresting. Another remark we may refer to in this lecture, as suggesting a subject for consideration. "The remains of Greek monuments and the valuable description of Pausanias prove to us that the Greeks never admitted the miserable expedient of modern architects who think to produce a grand general effect by conforming all the buildings of a public square, whatever be their separate destination, to the same design." This system is even more carried out in modern Paris, where these lectures were written, than with us; but we also are so used to it that few of us, probably, ever regard it as a subject for question. In some aspects of the system we are not quite so certain of its absurdity as our author. A large row of dwelling-houses, which are all on the same scale, and for the same purpose, we think, may, though they are distinct tenements, be legitimately treated as a symmetrical whole, and this is not incompatible with sufficient difference of detail and ornament to impart individuality to each separate dwelling. Treating a whole square, in which the buildings have various objects, and are on various scales and arrangements internally, in this uniform manner, is another thing, and cannot be defended on any rational grounds.

The detailed criticism on Roman architecture, in Lecture IV., though the subject seems of less artistic attractiveness, is one of the most interesting, from the novelty and originality of many of the ideas brought forward. As may be supposed, M. Le Duc is no enthusiast for Roman art; yet he fully recognises the element of greatness in it, and observes in one passage that Roman ruins produce so profound an impression because in them, in their forlorn nakedness, we see the essential character of Roman architecture, unspoiled by the questionable decorative taste of its builders. "One of those halls of Caracalla's baths, whose walls are shattered, whose piers are laid bare, and which exhibit to the astonished sight the gigantic mechanism of the Roman structure, would produce a less effect, perhaps, if we saw it draped, with its useless columns, its marble veneering, its decorations for show." But the author does not by any means deny that the Romans showed great architectural and artistic power in some of their works; his critical estimates of Trajan's column and the Pantheon are as sympathising as they are eloquent; and he holds up the Roman architects as examples, in spite of their corruptions of style and method, in one very important sense, in a passage which must form our last quotation, and which is *apropos* of the Coliseum and the numerous difficulties connected with the plan and construction of such a building:—

"It is these general dispositions of Roman buildings that are contrived with such profound insight that deserve our chief attention as examples. . . . . The Roman is never in uncertainty; his position indicates a very advanced civilisation, which submits everything to reasons of State. He commands as a master who knows exactly what he wishes and what he needs; and he knows how to make himself obeyed, because he knows how to make himself understood. . . . . Even now, in spite of our civilisation, in spite of the strength of our institutions, our ideas in art are vague and confused; we do not know what we want, and our public monuments are no sooner finished than we find them grossly defective, and perceive that we must modify or rebuild them at great expense. Our artists dispute about style,—are engrossed by one particular school of architecture,—condemn or approve such and such a form of art,—adopt or repudiate such and such a tradition; but as to the broad and true way of appreciating architecture becoming to a great people, it hardly occurs to them;—happy if they are allowed to carve the profiles they prefer, or to put columns or pinnacles here and there according to their fancy. As we are said to be of Latin race, let us resemble them at least in their excellencies. I fear, however, that we approach nearer to those Roman-Greeks of Byzantium, who were disputing about the light on Tabor while the armies of Mahomet II. were storming their ramparts."

We can only here add that the fifth and last lecture of the present volume treats partly of methods to be followed in the study of architecture, in which a good deal of what is said is what has been suggested in our columns at different times (sometimes almost in the same words). The work will be complete in six parts. To notice each "Part" separately and at length would be beyond our space; but we may return to the

work in detail when it is complete. Meantime, we specially recommend it to all young architects and architectural students, as a book full of learning, thought, and suggestion,—the product of a mind at once comprehensive in its range, and full and accurate in practical knowledge of details.

WORKS IN BLACK AND WHITE.

THE fourth annual exhibition of "Works in Black and White," which was opened last Monday at the Dudley Gallery, is an interesting and varied one, and contains somewhat less of the element of "original drawings for illustrations in the *Graphic*," and other works of that class, the superabundance of which we were disposed to complain of last year. On the other hand, there does not seem to be a very large proportion of that highest class of thoughtful and suggestive artists' work which gives the chief interest to an exhibition of this kind.

The largest work belonging to an ambitious class of subjects, and one of the largest of the drawings in the room, is a study in red chalk, by Mr. W. B. Richmond, for a picture of "Hercules and Prometheus" (215). This is not, to us at least, very intelligible; Hercules, a figure fronting the spectator, is, like the hero of the well-known song, shooting an arrow "into the air"; the head thrown back, with the face foreshortened, is very well given, the rest of the figure, the action of the legs, to our thinking, rather stiff; the part played in the scene by Prometheus, who reclines on the rock below, is not very obvious, but the figure is a fine study. Among other studies from the figure we notice a crayon head by Mr. Cave Thomas (108), and two very pleasing small sketches of heads by Miss Starr (156-7). Mr. Marks has two figures in his best style, of which "The Birthday Present" (99), an old gentleman, with spectacles pushed back, examining, with a half-pleased and half-critical air, a piece of porcelain, is admirable; and there is a humour that is, nevertheless, almost pathetic in the representation of the mild old monk who is "The Convent Drudge" (326). By M. Tissot is to be seen an etching under the title "Spring Morning" (56), in which an odious girl is the central object; and another etching, in a very free sketchy style, of a woman in rather odd costume standing "By the Window" (337), which is one of the cleverest and most original things in the room, and makes one wonder that the artist who can do this can so often content himself with mere commonplace figures.

Among the French artists whose names and works have been conspicuous in this exhibition since it was started, M. Lhermitte again delights us with his charcoal studies, among which there is nothing so remarkable or powerful, perhaps, in the way of figure-subjects as he has shown in some previous years; but there is real pathos in the "Petite Bretonne en Prière" (327) and the "Banc des Pauvres" (114), the expression in the latter depending mainly on the pose and sentiment of the figures, the faces being almost too roughly sketched; in the former the expression of the face is very finely indicated. A landscape, "The Boat" (127), and a town subject, the "Bridge at Landerneau" (218), with an extraordinary jumble of houses overhanging a space of black water, are both exceedingly fine, and, perhaps, realise the highest sort of effect that black and white can produce in this class of subject. The landscape studies, also in charcoal, of M. Achille Dien, are fully equal to some we have previously noticed, but are also a little too like them; the artist's range of subject and effect seems to be limited. Of M. Legros's contributions all are very good, some of them rather slight; but the etching entitled "La Mort du Vagabond" (416) is full of an almost terrible pathos; it is a thing that sinks into one's heart. The work is also a very fine specimen of the free, bold style in etching. To our thinking, the genius of M. Legros is shown to more advantage in these works than in his finished paintings.

Among the works which present specialities of excellence or of interest (and it is only those that we can find space to mention) are the pen-drawings of Mr. Edwin Edwards, among which we specially admire the studies of old man-of-war hulks, "The Old Bellerophon" (298) and the "Coal Hulks" at Portsmouth (381). Mr. Green's various pen-drawings for illustrations to a story in the *Graphic* are undoubtedly very clever, but not very refined in style or feeling. The sad and grim head of Mr. Carlyle appears in almost every exhibition now; if all the artists who paint him get sittings from him, we rather pity the "seer" of Chelsea. The likeness by Mr. Andrews (145) is not very successful in any sense. Rajon's etching from the portrait of "R. Spottiswoode, esq.," by Mr. Watts (150), is a beautiful specimen of the art. The drawing by M. St. François called "Chercheurs d'Obus" (195), a reminiscence of the siege of Paris, shows a desolate open space strewn with fragments of demolished buildings, among which one or two men are picking their way in search, we suppose, for "dead" shells which could be turned to account by the besieged. Mr. Harry Goodwin sends some effective and original drawings in a brown medium, of which "The Old Church, Winchilsea" (411), and "Evening, Caen" (464), are excellent. Mr. Glennie's sepia drawings, in their delicate tone and finish, scarcely hold their place against some of these rougher and franker methods of execution; but his "Morecamb Bay" (148) is a beautiful little drawing in a very pure and unaffected style. Among other landscapes, Mr. Palmer's "Old Yews in Norbury Park" (188), Mr. Arthur Litchfield's "Landscape" (231), Mr. Ellis's "Four Etchings of Paris" (310), Mr. Ridley's "At Rotherhithe" (353), Mr. J. H. Bradley's etching "Torcello" (389: an admirable work), Mr. Vaillant's "Atelier de Marayent" (404), Mr. F. E. Cox's "Homewards" and "Down Hill" (427, 478), Mdme. Cazin's "Windmill on French Coast" (531), and Mr. Watson's "Temple Bar" (538), are very good.

Mr. Arthur Hopkins's "Belle" (358) belongs only to the order of pretty things, but is so very pretty that it deserves a word. Mrs. Hopkins ought to understand that every one is tired of her joke of drawing little naked children, aping the attitudes of grown-up people; and to quote beautiful and serious lines of Tennyson's as an illustration to such nonsense as No. 386 is very bad taste. The lady is better in her two little "draped" children (399 and 540), in which there is real humour. Mr. Lawson's study of a little baby "Asleep" (252) is also very good. Among the jokes of the exhibition (there are always a few), the puppy "Puzzled" by the Noah's Ark animals (292) is not bad. The pen-drawings for *Punch*, by Messrs. Du Maurier, Keene, and Ralston, are all excellent, and show, even better than their engraved reproductions, what good artistic talent and humour are at the service of our contemporary, so far as the illustrative department, at least, is concerned.

An additional practical interest is given to this year's exhibition by the presence of two cases containing specimens of the tools used in engraving and etching, and of woodblocks, plates, and impressions in various stages.

While on the subject we may mention that a similar exhibition of "Ouvrages exécutés en Noir et Blanc" is to be opened at Paris during July, and that M. Deschamps, of the French Gallery in New Bond-street, is prepared to take charge of contributions from artists in England.

THE WATER-SUPPLY OF PARIS.

THREE years ago there was published a valuable Report, bearing the authoritative name of M. Maxime du Camp, respecting the water-service of Paris. Since that time, a curious development has taken place, proving to the great French capital that it cannot depend upon the river for its constant and natural supply. With that regard, therefore, which the French invariably exhibit for public interests of a social kind, a commission was issued, and its statement is in print, if not yet in circulation. But its publicity may be expected within the next few days. Meanwhile a brief recapitulation of the contents may be useful. Paris, it may justly be said, has taken the lead among the cities of Europe, in the matters of water and light, dark and miserable though its traditions have been. And yet it is a city, in this respect, of want and sacrifice; for there was, until lately, no worse-watered town to be discovered through the length and breadth of Europe. In plain truth, its principal streets have been considered to the disregard of its lesser thoroughfares, and the whole have suffered from the effects of this absurd municipal favouritism. But the new system is in full operation at present, and Paris enjoys now a real abundance of water. There is no quarter in which the mere turning on of a tap will not ensure an instant and copious service. Reservoirs, aqueducts, and fountains are far more numerous than in London. Paris, in fact, has escaped from what the Arab picturesquely calls "the hour of thirst." Yet this is an improvement of altogether recent date. When the last Report was published, during the earlier years of the Second Empire, the Cité, alone, of all that beautiful metropolis, enjoyed its pure and abounding issue from the hills around; and this water was irreproachably sweet. It was not derived from the Seine, which then held in solution a Thames-load of abominations and nuisances: yet this condition could not endure. The uncorrupted current flowed over a low marsh, and was polluted by it. But there was an explanation of this result, and it accounted for a great fact in the history of Parisian mortality during the ensuing years. The new aqueduct passed, by a tunnel, through "the Mountain of Martyrs," among graves and the uncoffined dead, and also through the vaults of a churchyard for the incurables, the consequence of which was the poisoning of an entire district for from between twenty and thirty years. However, all this has been abolished now the laughing little stream, the Bièvre, runs in place of the sour old sewer, and sparkles into the Seine, just under the grey, unfinished towers of Notre Dame; and the visitor is astonished to be told that those are the waters of Arcueil, brought by an aqueduct, *temp.* 1544, Roman and Julian in age and character,—*Guarda é passa*. There is not a syllable of truth in the legend, from beginning to end. These things are made up of Roman brickwork, and have no more true antiquity about them than the Bridge of Austerlitz. Nevertheless, they possess, no doubt, a particular interest. The monks of Saint Lawrence were determined to get drinking-water without having recourse to the Seine. They excavated, in an Indian manner, vast tanks at Romainville, Bruyères, Menilmontant, and Saint Gervais, and afterwards at Saint Martin-des-Champs,—St. Martin's-in-the-Fields, of London popularity,—and they did more than this, they dug a subterranean aqueduct, 7,000 ft. in length, which existed before the New River was actually in contemplation. Were these the works of ordinary workmen? No; of monks, who thus employed their spare, though not indolent, time. Let us honour them for it. Yet it must be admitted that they were, in a degree, selfish. They began, at any rate, by appropriating the waters of the wells and other sources to their own gratification. But King Philippe-Augustus put in a claim on behalf of Paris; and, after recognising his merits, we must, indeed, skip at least a hundred pages of the Report, in order that our own time may be reached.

Suppose, then, fifty ordinances, until we reach the present day. Paris now drinks from the Seine, from L'Ourcq, and from the Marne, from the wells of Arcueil and of Huis, and from the artesian wells of Grenelle and Passy. Its fountains are also fed from the steam apparatus at Chaillot, and from the ingenious mechanism at Belleville; and in all these places it is remarkable that the local territorial incidents are similar; that is to say, that the rain falling on the hills does not descend altogether into the valley, but is, in a main part, absorbed by the slopes, and furnishes Paris with its largest supply of water. Of course, however, advantage is taken of every opportunity possible for gathering into distinct channels, tunnelled or not, all the sweet water that can be accumulated, in order both to spare the Seine,—which is exceedingly impoverished in its current, at times,—and to provide a purer draught for the citizens. Still, the hollows cut through the earth, and constructed of unmortared masonry, from Belleville and the Prés-Saint Gervais, are neither more nor less than common drains, though used for drinking purposes, and they bring all manner of abominations with them. They are sewers, in point of fact, as M. Maxime du Camp confesses, and it is to be wondered at why Paris takes the trouble to be proud about them. So much is admitted in the official Reports—and French official Reports, we are bound to say, are, as a rule, unsparing. But there is a brilliant side of the picture, to which we willingly turn. It is that of a vast system, perfectly regulated, of reservoirs carefully covered in, not architecturally handsome, but protected from all unhealthy influences, with immense currents perpetually pouring through them,—tomb-like, the Parisians say,—and piled over with "brutal" masses of architecture to keep the water cool. Among the new structures may be seen many of older date; as early, indeed, as the middle of the seventeenth century, the outer walls and embankments of which are hoary with lichens, although the tanks are as pure and as free from noisesomeness as though they were the works of the Moguls, and had belonged to the marble

groups of Agra. These were architectural efforts, however, and no more recent monuments of a similar Parisian ambition remain. Notwithstanding, the water-system of Paris is improved, from year to year, and it is scarcely too much to say that every drop from the fountains of the earth, in the neighbourhood of the capital, or wherever it can be reasonably sought for, is utilised. Generally speaking, thirsty Paris has its thirst quenched from the north. The waters of the south are soft, and slightly unwholesome, though they sparkle brilliantly enough in the way of fish-ponds and fountains. The supply from them, however, amounts to not more than a million of gallons a day, which is a fractional total, for so large a city; and it is principally gathered through an aqueduct across the valley of the Bièvre, a work Roman in magnitude, with 500 yards of archway 70 ft. above the common road, in many parts, and with magnificent spans across canals and roads. Indeed, some relics of the Julian period are still to be traced in this monumental work, which French archæologists, however, affect to despise, for the plain, though insensate, reason that it has been put to common uses. It stops short, however, about 8,000 yards from the point of general distribution. Here is a gigantic hall, resonant with "the voices of many waters"; immense pipe-holes pierce its walls; a canal runs through the centre of the floor; there are pathways on both sides of it; galleries run above, with white-arched windows, letting in as much light as can be expected; the whole perspective suggests a prodigious cloister, with an ominous, offensive sound, though not much of a repulsive scent, pervading it. Taken for all-in-all, indeed, the atmosphere is rather refreshing and pleasant than otherwise. But it is impossible not to detect,—as the Report, indeed, avows,—the influence of the weather, above and beyond all artificial arrangements or precautions. Thus, when heavy rains have fallen, wells are full, rivers have overflowed, and even the gutters have been choked, the water-supply of Paris is out of order,—is unhealthy, is contaminated, and bursts with black bubbles into the cisterns, which, as every one knows, are always exposed to the rainfall. These are points especially insisted upon by the authors of the Report, who declare that numbers of water-sources, once famous in France, and especially in Paris, have been stopped up for architectural and other purposes, and who also remind their fellow-citizens that they were in danger—the Seine notwithstanding—of something like a water-famine during the German siege. Six steam-pumps were kept at work, by day and by night, in that sad time, at the Port d'Anglais, the Maison Alfort, the Quai d'Austerlitz, Auteuil, Saint-Ouen, and Chaillot, and even then the supply threatened to become a devastating scarcity. The cost of the machinery, and of its operation, was among the most remarkable items in the Budget of Paris, during that calamitous year. The Ourcq, however, flowed freely through its tunnels, which, upon their approach to the capital, are constructed of massive blocks, solid as those of a pyramid. There are sections, indeed, through which they pierce a kind of comparatively valueless coal-field, but through the lateral avenues of which water rushes at a tremendous rate, and in an enormous volume, though, at La Corderie, the Report tells us, a wheel of 90 ft. circumference is required. It is strange enough to find that, in this vast water gallery, a triple grating is needed to prevent the ordure of the suburbs from floating *into*, rather than *out from* the subterranean aqueducts of Paris. And, most repulsive of all, perhaps is the growth, upon those stone walls, of the "vegetable spider," bred at 26 degrees, *à zéro*, and a creature sufficient to infect any water under heaven. But the animalisation of the lakes, streams, and ponds of Paris is not, just now, all important. The capital of Paris is seated upon a curve of her capital river, which, by Frenchmen, in their odd way of talking, is called a gigantic corkscrew. Whatever that may mean, it has nothing to do with the scheme at present in view,—which is, through a grand series of hydraulic works, to secure for Paris a plentiful supply of water to drink,—water well selected and scientifically certified, selected from known sources, and free, so far as can be ascertained, from malarious influences. Eleven years have been devoted to this task, and the results have been very creditable to the public spirit of the Government of France. Thus, the commissioners have pointed out the sources of the Lhuis, at Parjois itself; they have explored all the tributaries of the Vanne; they have gone to the fountains of the Yonne, and, when we know that this means the difference positively between food and poison, we shall comprehend the importance of the general topic. Eleven pestilential rivulets flow their filthy weight into the Yonne, which creeps, black and heavy, into Paris, like a crime, and no tree, no flower, no herb of any kind will flourish upon its banks, where children are supposed to be nurtured up to girlhood and womanhood, nevertheless. Five years ago, an attempt at reform was commenced; there were new aqueducts opened; new, pure, clear conduits, cool and close-roofed, to supply the people of Paris, free from metallic taint, and from all chemical associations. Then was undertaken, and soon was completed, the existing system of Parisian waterworks. In their own superb language, the French commissioners report that "they constitute one of the most inspiring works which it is in the power of man to contemplate." We pass on, without feeling so precisely sure upon the point; but the new Parisian works are unquestionably imposing, and, at the same time, not obtrusive. The original design was, happily enough, abandoned. There are no bronze tritons, and there are no marble nymphs. There is a reservoir, three acres in length and width, with a uniform depth of 15 ft., perpetually full, banked up, on all sides, by a forest of palisading, to support the earthworks, and, although this is by no means the principal source of the Parisian supply, it is a main one, and exceedingly important. There are sixteen others, indeed, but, in comparison, they are insignificant. The official Report, just published, mentions only nine of them, the others being subsidiary, and, in a way, auxiliary to the rest.

THE NATIONAL GALLERY, BERLIN.

IT would be difficult to find a parallel in history of a rate of increase which could be compared with that of Berlin, the capital of Prussia, and now of the German empire. Originally a Wend fishing village, on the sluggish river Spree, it did not attain to any degree of importance until, in the days of the great Elector, it became the centre of the powerful State of which he may be said to have laid the foundation. It is situate about 100 ft. above sea-level, in the midst of a dreary plain of sand, destitute of either beauty or fertility,—"an oasis of stone and brick in a Sahara of sand." At the end of the seventeenth century it numbered, however, but 50,000 inhabitants. It made more progress during the reign of the first Prussian king, Frederick I. and his successors, until, at the death of Frederick the Great, its population numbered 145,000. But the city increased at an enormous rate during the present century. In 1833 it had 250,000 inhabitants; in 1858, the population, including a garrison of 15,000 men, had increased to 455,000, while now it ranks fourth amongst the capitals of Europe, numbering nearly a million inhabitants, of which 22,600 are soldiers of the garrison, 20,000 Roman Catholics, and 16,000 Jews. Amongst its population should be mentioned 6,000 French Protestants, the descendants of those exiles who were driven from their native soil by the intolerance of Louis XIV., whose attribute, "le grand monarque," reads like a satire by the side of such shortsightedness which could deprive France of some of her best children by the revocation of the Edict of Nantes. Berlin received the refugees with open arms, and has reaped ever since, along with the whole of Prussia, the benefits of such a wise course.

The area of the city is somewhat out of proportion to the number of inhabitants, covering as it does a space of 7,000 acres. The city is mostly composed of long straight lines, and shows throughout traces of modern origin. Its principal street, Unter den Linden, is so well known that we need say but little on the subject. It contains the finest buildings in a limited space, being but three-quarters of a mile long. If we enter it at its western end, the Brandenburg Gate, the model of which is the Propylæum at Athens, we pass by the palaces of the royal princes, the University, the Arsenal, the Opera House, the Academy of Arts, the Russian and English embassies, &c. Crossing the Schlossbrücke, we enter the grounds on one side of which is the Schloss, or Royal Palace, the Cathedral, and the Old Museum, designed by Schinkel, with its most beautiful colonnade adorned by the frescoes of Cornelius. Behind the latter is the New Museum, designed by Schlüter, which took twelve years to build, certainly the most striking building in Berlin. The new National Gallery, of which we gave an internal view in a recent number, and the exterior view of which is the subject of the illustration in our present number, faces the principal façade of the New Museum.

We have already given full details of this latest of Berlin's great buildings,* and we need add here only a few remarks on the great changes and additions which this quarter of Berlin, the so-called Museum Island, is to undergo. The railway which is to be constructed through Berlin will cross the island on a high viaduct, 600 ft. long, behind the museums. This will involve a rebuilding of the Custom-house. A great desire had been manifested for entirely removing it, and utilising the space thus gained for the construction of museums and galleries. The Government, however, has no intention of gratifying this wish, but it is willing to meet in another way the views of the merchants and artists. A colossal building for the Customs' warehouse and central depôt is to be erected at a distance of 200 ft. from the National Gallery, on the northern part of the island. It will have a width of 600 ft., with a depth of 700 ft., and will rise close to the Spree to a height of 60 ft. The railway will run in a tunnel through the building. Upon it will be constructed a plateau, after the manner of Brühl's Terrace at Dresden. Gardens, rows of trees, fountains, and statuary are to make it a pleasant promenade. An approach will lead from the south, opposite to the New Museum, to the plateau, and terrace-like bridges will connect it with the Park of Monbijou and the western bank of the Spree.

A larger imposing building is to receive the Academy of Sciences, and afford in its upper floors space for art exhibitions. Galleries of less elevation are to connect it with wings in which picture-galleries will find a home. All these buildings, in harmony with the National Gallery and the other Museums, will be in the Greek style. A colonnade is to lead round the terrace, intersected at the three approaches by triumphal arches in the manner of propylæa. The centre of all these new plans will be formed by a gigantic statue of Germania, to be executed in such dimensions that its gilded crown is to tower over all the buildings of the city, and be seen far and wide. The Park of Monbijou, which is to be formed into a town park, and the palace of which is to be changed to a Hohenzollern Museum, is to be in connexion with it; and gardens will be laid out on both banks of the Spree, obtained partly by the transformation of the ground in consequence of the construction of the railway, partly by the taking down of the artillery barracks. All these changes will make this part of Berlin one of the most beautiful spots to be found in any capital.

PENNY ART HANDBOOKS, SOUTH KENSINGTON MUSEUM.

WE took occasion some short time ago to review one of the interesting Shilling Art Handbooks published for the Committee of Council on Education in connexion with the South Kensington Museum.† These are reprints of the dissertations prefixed to the large catalogue of the chief divisions of works of art in the museum, arranged and abridged by Mr. William Maskell so as to bring them into portable shape. This was a very good step, and has placed a large amount of sound information, with engraved illustrations, within easy reach. The authorities, however, have now gone farther, and have issued a series of thirteen Penny Handbooks of the Industrial Arts, largely illustrated, which are sold at that price only at South Kensington Museum and the museums in connexion with it, or in one volume, in a paper cover, including 240 excellent illustrations, for a shilling. A library edition, bound, is sold by the publishers at an advanced cost.‡

The following is a list of the penny parts:—1. Gold and Silver Work; 2. Bronze, Copper, and Iron; 3. Enamels; 4. Furniture; 5. Ivories; 6. Pottery and Porcelain, in two parts; 7. Majolica; 8. Glass; 9. Mosaics; 10. Arms and Armour; 11. Textile Fabrics; and 12. Lace.

If any of our readers can only afford a penny for information on the subjects within the scope of this list, in which he is interested, he cannot by any possibility lay it out better than he can at South Kensington.

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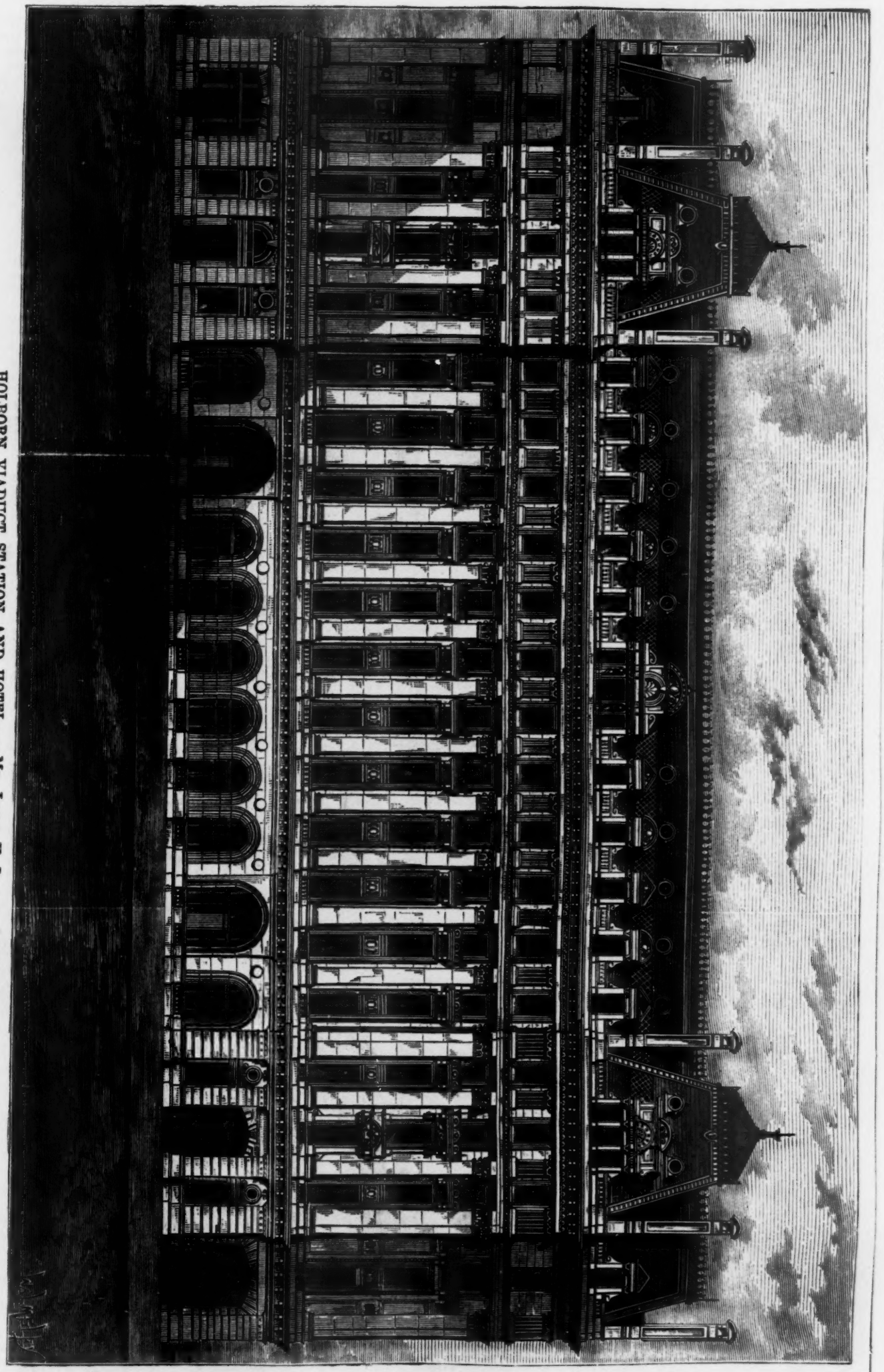
* See p. 510, *ante*.

† Chapman & Hall, Piccadilly.

‡ The Industrial Arts. Industrial Sketches. With numerous illustrations. Chapman & Hall.]

THE NATIONAL GALLERY, BERLIN.



HOLBORN VIADUCT STATION AND HOTEL.—MR. LEWIS H. ISAACS, ARCHITECT.

HOLBORN VIADUCT STATION AND HOTEL.

THE building forming the subject of our engraving is the City Terminus of the London, Chatham, and Dover Railway, which was opened for traffic a little more than twelve months ago. Some particulars of it were recently given in our pages. It occupies an area of ground, having a frontage to the Holborn Viaduct of 235 ft., by a depth of 70 ft. At the western end of this area is the low-level railway connecting the Chatham and Dover with the Metropolitan and Great Northern lines. To enable the building to be carried over this low-level railway, three enormous girders were constructed to carry the front, back, and centre walls, and from these smaller girders were fixed to carry the subsidiary portions of the building. The design of the principal girders and of the station and booking-offices was entrusted to Mr. Mills, the company's engineer. The utmost caution was necessary in getting the girders into position, and it is satisfactory to notice that, notwithstanding the traffic on the low-level line was not interfered with, no accident whatever occurred.

The station proper contains a booking-office of handsome dimensions, with first and second class waiting-rooms, cloak-room, parcels and telegraph offices, and the usual accommodation for the station-master and his subordinates. On the platform level will also be found the restaurant, a fine apartment, 70 ft. long, 30 ft. wide, and 20 ft. high. This room is elaborately decorated, the walls being covered with encaustic tiles and majolica enrichments; the ceiling is deeply coffered, gold and colour being freely used in its embellishment.

Adjoining the restaurant is the entrance to the hotel, leading to the hall and principal staircase. The latter is 20 ft. wide, and a noticeable feature in its planning is the abundance of light which prevails.

The first floor contains the principal coffee-room, 63 ft. long, 36 ft. wide, and 25 ft. high, the walls of which are being covered with Mexican onyx marble; the ceiling is formed of carton pierre, the plain surfaces being enriched with colour. There will also be on this floor a ladies' coffee-room, reading-room, public billiard-room, to contain four tables, smoking-room, and several private sitting-rooms of varying dimensions.

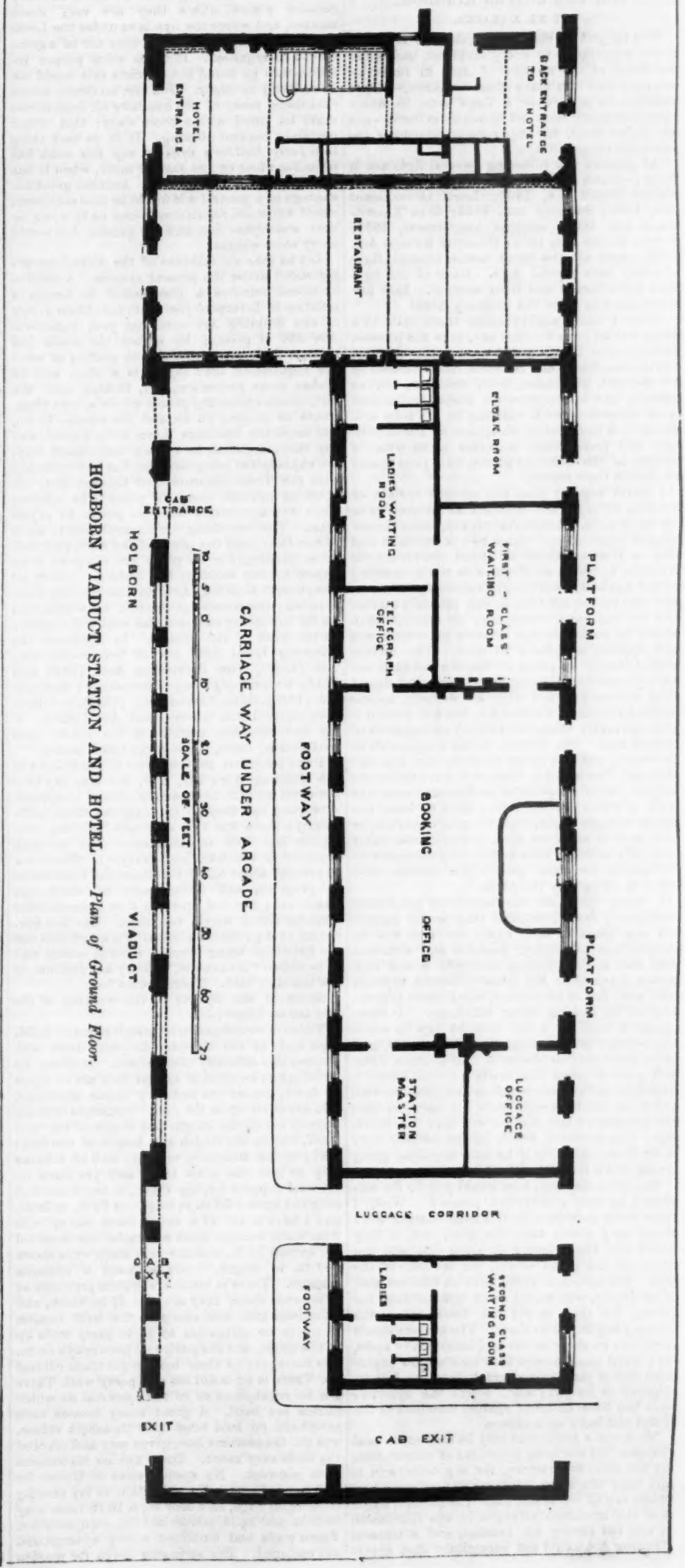
The four floors immediately above are intended for the accommodation of the patrons of the hotel, and are laid out as sitting and bed rooms. The sixth, or top floor, is devoted to the service of the hotel, the kitchen being placed at this level, thus ensuring immunity from the smells usually attendant upon culinary operations. Powerful lifts are provided for the conveyance of passengers and their luggage from the ground level to the upper stories of the building.

The façade next the Viaduct is entirely composed of Portland stone. It is Italian in character, with a good deal of French feeling exhibited in the fenestration, the dormers, the Mansard roofs, and the carved enrichments. Noticeable amongst the latter are the shields between the first and second floor windows; on these are cut the arms of the different cities and towns through which the railway passes; the effect of the carving is much enhanced by the ground being picked in with gold.

The hotel is to be opened for business at Christmas next, under the management of an experienced firm of railway refreshment contractors.

The works in connexion with the building have been executed by Mr. William Webster, from the designs and under the superintendence of Mr. Lewis H. Isaacs, architect. The whole of the carving on the front was executed by Mr. Thomas Bromfield.

The outlay involved is, in round figures, 120,000*l.*



HOLBORN VIADUCT STATION AND HOTEL.—*Plan of Ground Floor.*

Crosses in Churches.—The case of Masters *v.* The Rev. John Durst was before the Judicial Committee of the Privy Council on the 29th ult., on appeal from the Arches Court. It appeared that on the 27th of May, 1875, a movable wooden cross was placed, without the sanction of a faculty, on the re-table of the Communion table. Two days afterwards Mr. Masters, the parishioners' churchwarden, removed the cross out of the church without a faculty, and he is willing to give it to the vicar, but not to restore it to the place whence he took it. The present contention is whether the cross in the position mentioned is not forbidden by law. The argument on the legal point occupied the whole day.

ON GENERAL BUILDING REGULATIONS FOR THE UNITED KINGDOM.

BY MR. J. CLARKE.

THE subject of building regulations is one of great importance to every architect, and when we think of the number of Acts in force, we are surprised how many of our brethren,—whose practice extends over a large area, in which there are many Acts and bye-laws in force,—get on under them, for they cannot remember the conditions imposed by all.

At present the following general Acts are in force:—Town Improvement Clauses Act, 1847; Public Health Act, 1848; Local Government Act, 1858; Sanitary Act, 1846; ditto Amendment Act, 1864; another Amendment, 1874; Public Health Act, 1875; Chimney Sweeps Act, 1875. And all the large towns (except Manchester) have special Acts. Many of the bye-laws are different one from another. How few there are who know the Sanitary Acts!

What I think would remedy these evils to a great extent is as follows: say, take the present Metropolitan Building Act as a basis, expunge the clauses found not to work, insert clauses as to strength of timber, iron, concrete, &c. as needed, and incorporate all the miscellaneous Acts connected with building in it; take evidence by a commission composed of Parliamentary and professional members as to what is wanted in the different places, and then frame an Act on their report.

I would suggest that the present system of building surveyor and districts be adopted as in the metropolis, except that in, say, three situations in England and Wales, two in Scotland and two in Ireland, there be head surveyors or referees, to whom all disputes as to the meaning of the Act and its carrying out should be referred, and who should see that it was properly carried out by the local surveyors; or another plan would be to divide the country into hundreds and appoint a referee to each. The referee should decide all cases of dispute between the surveyors and builders or proprietors; but should they not be satisfied with his decision, appeal might be made to the board in London (whom I shall presently bring before you) on payment of certain fees. The referees to be responsible to the board, and also to see that the Act was carried out. The board in London to have the entire control; to be composed of professional members with a Parliamentary head; they to have the power to make regulations for new materials, or new ways of using old ones, and in special cases to modify existing laws and to be answerable to Parliament for their acts. The referees and board to be paid by the State.

I would have all the surveyors practising architects; firstly, because they would imbibe the new ideas as they came out and not be obstructives; secondly, because one architect who was not a building surveyor would look pretty sharp after his more fortunate brother, who was; not as at present, when there is great neglect in looking after buildings. I came across a building a few months ago in which the beams were not according to the Act, and there were wooden blocks in half-a-dozen flues, and several other like matters; and about a fortnight ago a sewer which had no junction with the main, but both ends were left open, so that the sewerage might find its way into the building. One architect would inform another very often from friendship if he saw anything going wrong in his friend's district.

But some may say, how would you do for surveyors in very countryfied places? Well, I think some architects from a neighbouring town would very gladly take the post, and, if they would not, the overseer or some one who has duties in the place would, for the sake of the fees. The kingdom would have an efficient staff of surveyors, who would show neither fear nor favour, for they would not know when the referees might pop on them. The present Board surveyors do show favour and occasionally spite, for I could name houses that have not 50 superficial feet of yard space, much less the 100 ft. required to be left; also, where the bye-laws have not been enforced against members of the Board and have upon others.

No doubt a great deal may be said as to local customs, but the main principles of construction are the same everywhere, for a granite wall is put near the same thickness as sandstone, and bricks are all about one size. The cottage, which is of the minimum strength in the Highlands, is not too strong for London, and a General Building Act would not necessitate that everybody should build of the least strength allowed. There are no Building Acts in force in many country places where they are very much wanted, and where the bye-laws under the Local Government Act are in force they are to a great extent disregarded. If there were proper inspectors to go round the districts this would not be so likely to occur. You are, no doubt, aware that under many of the bye-laws all deficiencies must be found within three days: this would certainly require altering. It is an easy thing in a Jerry builder's eyes to say the work has been done four or five days or more, when it has only been done perhaps one. Another great advantage of a general Act would be that architects would know the regulations,—not be in a fog, as they sometimes are, and the general Act would carry more weight.

Let us take an instance of the difficulties experienced under the present system. A London architect receives a commission to design a building in Liverpool (he could not obtain a copy of the Building Act until last year because it was out of print); he makes his plans and perhaps finds great difficulty in getting at what the regulations are: say it is a shop, and he wishes some projection, and, looking over the Act, comes across the clause which allows shop-fronts to project 12 in. and the cornice 18 in., and sends the drawings down to be passed, and has them rejected, he cannot understand why, the explanation being that he has not complied with the Town Improvement Clauses Act. It is not an unusual thing for plans to be rejected when the authorities have no power to reject them. The best thing for an architect to do is to carefully read the whole of the Acts, and then go on building, for no plans are required to be passed for any building but houses. Nearly all the present Building Acts in the country want revising; the present generation have improved on the preceding one, and the next will improve on the work of the present. In Liverpool the following Local Acts are in force:—Building Act (1842), Fire Prevention Acts (1843 and 1844), which apply to warehouses only; Sanitary Act (1846), ditto, Amendment (1864), and Bye-laws under Local Government Act (1858). If we had one Act embracing the whole, and modernising them, it would be much better.

I will point out to you a few of the defects of the Building Act; but, first, we may say that the town council have ample power to appoint surveyors, but they do not exercise them sufficiently; there are two assistant building surveyors and two sub-assistants (the borough engineer is the building surveyor). There are at present about 6,000 buildings and alterations in progress, and 3,000 cases of dangerous structures; the Act provides that discrepancies must be noted within ten days. Too few surveyors to cope with so much work and find out the buildings being erected without notice, and to be called "Assistants." They are paid out of the borough fund. There are no fees.

Some of the defects in the working of the Act are as follow:—

There is no obligation to submit plans of buildings, and, as the Sanitary Act only deals with houses, this difficulty often arises. It allows no buildings to be erected except they are of stone or brick, hence the ordinary circus buildings, &c., are contrary to the Act. Thickness of walls depend not on the length and height of the wall itself, but on the length and height of the front wall; so the staircase, or party wall of a house may be put one brick thick and yet have no internal support for, say 60 ft., if the front wall does not exceed 36 ft. in height, or 39 ft. in front, and I have heard of a stable being put up with 9 in. walls because what was called the front did not exceed 15 ft., and the side walls were above 100 ft. in length,—one adjoined a common passage. There is not the slightest provision as to internal walls, they are put 4½ in. thick, and sometimes still less, except in the best houses. There is no obligation to build party walls up to the slates, and the jerries do not always do so. The surveyors do their best to get them carried up. There is no definition of a party wall. There are no regulations as to the material on which houses are built. A great many houses have been built on land filled up with ashpit refuse, and the foundations have given way and cracked the walls very much. There are no regulations as to ironwork. No special sizes of timber for warehouse floors. No obligation to lay bearing timbers on edge, so a floor for a 16-ft. room may be 8-in. and 2½-in. planks laid flat,—a queer floor. Fence walls and buildings wholly underground are excluded. The strengths given for wooden beams is too small in many cases for warehouses. Nothing about roof principals.

You will see that the foregoing very much increase the duties of the already very much overworked surveyors, and seriously mar the efficiency of the Act.

The Fire Prevention Act does not apply to dwellings or public buildings. When a new Act is formed it would be needful to include provision as to the safety from fire for dwellings, and especially for places of public resort.

It is a matter of question whether all plans should be submitted and passed, and I am inclined to think it unnecessary, as the disadvantage of having the surveyors to look over the drawings and say whether they are correct is great, for some matters might escape attention, and then the builders would say when the discrepancies were found out, "Oh! but you have passed the plans and this was on them," and it would tie the hands of the surveyors to a great extent. Also they would not be so inclined to look sharp after the building when they saw that the plans were according to the Act. The Liverpool Jerries are aware of this, and carry it to perfection, for they send in different plans to those they intend to build from.

One of the greatest difficulties is the finding out of alterations and new buildings. I think if the builders were prosecuted a little more it would act as a deterrent to this sort of thing.

I have thus endeavoured to bring before you the necessity of a General Building Act, and some of the disadvantages we in Liverpool observe arising out of the present system.

REGISTRATION AND CLASSIFICATION OF HOUSES.

BY MR. JAMES SELLARS, JUN.

THE subject which forms the title of this short paper is one to which the Society I have the honour to represent has recently been giving some attention. Being a subject which had at least the merit of novelty, and believing it would be found not unworthy of your consideration, we suggested it as a suitable one for discussion in response to the invitation of the hon. secretaries of the Conference. I am not the author of the scheme. I have simply undertaken to bring the subject before this meeting, and I shall do so as concisely as I can.

Mr. John Cowan, of Glasgow, was the first to suggest the idea at least in Scotland. His paper on the subject which was read before our Society has been reported in some of the professional papers, but I trust you will bear with me in repeating,—as I must necessarily do,—the gist of his paper, so far as it dealt with the details of the scheme. The publication of the paper will have, I hope, directed the attention of many gentlemen present to the subject, and my bringing it before this Conference will give an opportunity for its being discussed and having its merits and demerits brought to light in a way which no merely local discussion could do, and perhaps initiate some general movement for giving it practical effect should it bear the test of criticism, and meet with any measure of approval from the collective wisdom and experience of such an assembly as this.

What, then, is this new scheme which, as a practical idea, has just been launched by one of our Glasgow builders? For what reasons is the adoption of such a scheme either necessary or desirable? And in what way does it interest us as architects?

I shall apply myself to answer these three questions as fully as the limited time at my disposal will admit of.

First, then, it is a proposal to apply to house property a system analogous to that of "Lloyd's Register," as applied to shipping.

The machinery necessary for the scheme would be (1) a committee or board, consisting of say representatives from the architectural and legal professions, the mercantile community, and the building trades; and (2) a staff of thoroughly trained inspectors or surveyors. For the guidance of these officials a standard specification or specifications and set of instructions would be prepared which might be so general in their terms as to apply over all the United Kingdom. To these could be added such clauses as would be necessary to meet the different modes of construction, peculiar to certain localities.

Buildings which were to be registered would require to conform to this specification, not, perhaps, to the very letter,—because it would be impossible to do so in many cases,—but to the

spirit; that is, they would have to be constructed in a way which would come up to the maximum of excellence required by the standard specification.

It would be the duty of the surveyors to visit the building from time to time during its progress, and in accordance with their report at completion the committee would register it in Class A, B, or C, as the case might be.

The register would contain such information as the following:—Situation and kind of building; date of erection, name of architect and builder; character of foundations; system of drainage; thickness of walls; scantlings of wood and iron joists and beams; details of plumber work, gas-pipes, and bell-hanging; kind of fire-proofing, if any,—in short, a complete record of the kind and quality of all materials, and the mode of construction employed in a particular building, dealing specially with such details of construction as are hidden by the very completion of the building.

The register would be available for reference to all who paid the fee which would be charged. Fees would also be charged for each registration, and the fees derived from these two sources would form the fund from which the secretary of the committee and the surveyors would be paid. These surveyors should be a superior class of men, and be required to pass an examination either by the local Institute or the Royal Institute. The salaries of these officials ought to be liberal, and they should be strictly prohibited from doing any other kind of work.

It is not, of course, meant that the registration would be compulsory, but its advocates are sanguine enough to hope that the benefits would be such as would induce those interested in house property to conform to the standard specifications and seek for registration.

It is thought that three such committees and staffs of surveyors would be sufficient for the work in Scotland,—say, one at Aberdeen, one at Edinburgh, and one at Glasgow. These officials would overtake the work of the smaller towns in the district of which their head-quarters were the centre. The same system, with, of course, a proportionately larger number of centres, might be applied to England.

Such, then, is a brief outline of the scheme as set forth in Mr. Cowan's paper, and which we in Glasgow have been discussing.

Crude and unworkable it may be in its present form, but if the idea is one worth pursuing, a proper and efficient system for carrying it out would no doubt be devised.

I will now deal with the second question, viz., "For what reasons is the adoption of such a scheme either necessary or desirable"; and I think I shall be able in a sentence or two to show that it is both.

I shall be within the mark when I say that nine-tenths of all the domestic and commercial buildings in Glasgow and other large centres of industry in Scotland are built by the investment of the capital of those who personally know nothing of them as examples of construction, but look upon them simply as a safe investment for their capital. The value of such property, in Glasgow alone, must be reckoned by millions of pounds sterling.

In most large towns a considerable proportion of such property is erected without the plans or superintendence of the trained architect. In Glasgow, buildings innocent of an architect might be numbered by the street, and it is all but certain that they are of a kind which would not be classed A1 on the proposed register. These houses are, as a rule, built to sell, and at present they do sell, in most cases, at as high a price as the well planned and constructed building. There is thus no encouragement for the conscientious builder to get his house well planned and constructed. Under this system it would become the interest of the builder to do so, otherwise he would find no market for his wares, as the purchaser would certainly be guided by the register in making his investment.

If, then, it is admitted that "jerry" building exists to a large extent, and, I think the fact will hardly be denied,—and that this system of registration would help to stamp it out, encourage good planning, and tend to raise the standard of excellence in construction, I submit that the necessity and desirability of such a system must follow.

Now, as to the third part of my subject,—in what way does it interest us as architects? This is a question which such a meeting as this is fairly entitled to ask, and I hope I shall be able to answer it in a satisfactory way, otherwise I fear I shall have committed a grave error in presuming to occupy your valuable time.

If it is assumed that the result of the scheme would necessarily be an improved class of building, surely it is a system in which we whom the public hold responsible for healthy and safe houses to live in, and premises in which to carry on their business, must take the deepest interest; and if it is a scheme which it is desirable to carry out, our profession is bound to take an interest in it, and assist in putting it in working order, as it would be impossible to arrange its details without our co-operation.

But, it may be asked, are we not, by setting up a standard specification, and detailing the best mode of construction, simply helping every man to become his own architect? To such a question I would answer, No. For, although we say that walls of such and such a height are to be of a certain thickness, that joists over a given span are to be of certain scantling, and otherwise detail the various particulars of construction, it is only the trained architect who can bring the parts together and construct with economy and skill.

This is a fact which the capitalist will very soon recognise, and he will see it to be to his advantage to employ the qualified practitioner, so as to insure his building being constructed with economy, and in such a way as would entitle it to be registered in the first class.

May I therefore assume that the tendency would be in the direction of employing the trained architect to the exclusion of the poachers on our preserves, who have too frequently large commissions entrusted to their unskilful hands?

I think I have said enough to show that on public grounds, and even on professional grounds, the scheme is deserving of our support.

Before concluding there are one or two other points I should like to refer to. There is no doubt that such a scheme would be an immense boon to the legal profession and other bodies having money to invest in public buildings, and as they are the "public" from which many of our clients come, they are entitled to our best consideration. This register would afford them a reliable means of getting at the character of the property to be invested in. But would not this affect the vested interests of the licensed valuator? Would he not, like Othello, find his "occupation gone"? On the contrary, he too would have something reliable to work from, and his skill would be reserved for the consideration of the locality of the building, its depreciation from age, the value of the ground, and the many local circumstances which affect the value of property.

Another point which is of some importance may be mentioned. Suppose the case of the purchaser of the "jerry" house finding, after he has entered into possession, that he has no privacy in his rooms, as sounds can be heard all over the house; that the drains get choked, as they lead to nowhere in particular; that the plumber work is all wrong, or that doors will not shut, as the house has sunk half a foot on one side. Such cases are by no means uncommon, and they tend to lower the character of our profession in public opinion, as the blame is generally laid at our door by the sufferers who are probably unaware of the fact that their houses are blameless of an architect. Again, it may be asked, Do not the building Acts secure all that this scheme is expected to accomplish? The answer must be, Certainly not. At least they have not done so hitherto. It is true the Building Act requires that walls of a particular height, shall be of a certain thickness, and that joists of given span shall be of specified strength; but it does not demand that the wall shall be a well-built wall, or that the timbers shall be of first-class quality. The Building Act may be satisfied with a minimum of excellence, but this system demands the maximum of excellence.

Had time permitted, I might go on multiplying arguments in support of the idea, but if I have said enough to explain the intention of the proposal, and put you in possession of material for discussion, my mission is accomplished.

I may say, in conclusion, the idea has been warmly received by our Society, and by several of the legal profession in Glasgow to whom it has been explained.

A committee,—composed of representatives of the various bodies whom it is thought might be represented in the permanent Board,—has been appointed to consider details and devise some means of giving practical effect to the scheme.

This is only a local movement; however, should it appear to this meeting, composed of representatives from all parts of the country, to be desirable and practicable, such a movement would be much more likely to have a successful issue if it were taken up by the whole of the profession under the auspices of the Royal Institute.

That the scheme is practicable with houses will, I am sanguine enough to hope, be admitted. The scheme on which it is founded has worked well in the case of ships, where the result has been to raise the standard of excellence of both design and construction.

Is it too much to hope for a like result from the "Registration and Classification of Houses"?

ANOTHER LOOK AT THE CENTENNIAL.

During my stay in Philadelphia I have not confined myself to the Exhibition, but I have devoted some time to the city and the suburbs. I have made excursions on the Schuylkill, and wandered up the Wissahickon, whose sylvan beauties will doubtless be illustrated by some of your contemporaries. I visited the great cemetery at Laurel Hill,—a lovely spot to "rest from labours," but where the "owners of lots" seemed, in their very pretentious monuments, more inclined to display their wealth than evince their grief. One lot was adorned with a figure in bronze, life-size. I thought it must be a monument erected to the honoured memory of some deceased President; but no, it was only to mark the resting-place of some private individual with a very common name. I also went to Girard College, a foundation for orphans. The founder, by his will, ordered "that no ecclesiastic, missionary, or minister of any sect whatsoever, shall ever hold or exercise any station or duty whatever in the said college; nor shall any such person be admitted for any purpose or as a visitor." By the same will he directed that the building should be raised on a certain place, and of such dimensions as he therein named. Whatever may be the opinions formed about the former directions, there is no doubt he had a practical knowledge of architecture, or he was well advised. The college is exactly according to his wish, and I am assured that the boys who have been educated at the Institution have turned out well, and many by their works have made themselves famous among their fellow-citizens. The education is of a practical character, as can be judged from the copy slips that are shown in the Pennsylvania Educational Department, a building in the Exhibition grounds to show the statistics, the productions of the pupils in the various schools in the State of Pennsylvania. Among moral reflections and sentiments, such as the youth of the old country have to copy, are "Keep strict accounts, and balance them often." Having entered into partnership, "Great exertions are necessary to effect sales," &c.

I went to the State Penitentiary, which was one of the first prisons that adopted, amidst a torrent of opposition, the "separate system"; but, alas! the prison is now too small, and they are obliged to put two into one cell very frequently. I asked why this was, and the reply was that the State Legislature would not grant supplies either to build a new prison, or to enlarge the old one. Our "great unpaid" in England, whom Mr. Briefless, of three years' standing, is trying so hard to supersede, would not allow this scandal. I was introduced in one of the cells to a man of whom Dickens wrote in his "American Notes" in 1842,—"In another cell there was a German. . . . . I never saw such a picture of forlorn affliction and distress of mind. . . . . a more dejected, heart-broken, wretched creature it would be difficult to imagine. My heart bled for him, and when the tears ran down his cheeks the spectacle was really too painful to witness. I never saw or heard of any kind of misery that impressed me more than the wretchedness of this man." The report on the prison, by Richard Vaux, in 1872, has this passage:—"This German prisoner, this 'picture of forlorn affliction and distress of mind,' was sentenced to this Penitentiary for the first time, May 15th, 1840, for five years; on June 28th, 1852, he was sent to this Penitentiary for one year; February 24th, 1855, he was a third time convicted and sent to this prison for two years; April 4th, 1861, he came again, for one year; on March 12th, 1872, he returned, for two years. Thus this picture of forlorn affliction and distress of mind is now a living, hale, hearty man of seventy-two years of age, having served out nine years of imprisonment, with all its horrors and cruelty, 'such as no man has a right

to inflict on his fellow-man.'" This was written in 1872, since which time he has "got into trouble" again. I asked him how long he had been in prison altogether, and he said "twelve years, and he had two more to serve." Among other questions I put was, "Do you remember the visit of Dickens, some years ago?" He answered, "Oh, yes!" but no tears ran down his cheeks, which I considered gross ingratitude towards such an advocate. I hope the member for Leicester will not meet with so bad a return for the sympathy he manifests towards garotters and other respectable criminals.

Street architecture here is of a uniform cut and style, like the garbs of the sect who give the *sobriquet* to the city. Churches have increased, and the *quasi*-Gothic style has been adopted by various sects. There is a light-green stone found in this State, which they call serpentine. They use it, however, dressed with white and brown stone dressings, which has a very good effect, especially with the latter-named colour. To this are added shafts of Aberdeen granite, polished, which harmonise very well.

Now back to the Exhibition. Since the opening great efforts have been made towards completion, but still it is most incomplete. The French have opened the greater part of their 400 tons which they imported, and these wares give a gaiety to the main building which it lacked when there was nothing in their places but cases with the glasses smeared with whitewash.

Walking over the American Department, I came upon some old books and newspapers exhibited by Messrs. Sower & Potts. I came upon the *Examiner*, a journal published in 1799 by the predecessor of that firm. It says:—"Norristown, Friday, December the 20th.—We have the painful task to announce to our readers that the *Father*, the *Deliverer* of our country, George Washington, is no more. Panegyric and eulogy cease to be eloquent,—the inexpressible sensations of the heart of a true American can alone do the melancholy event justice. This mournful scene took place on the 14th inst., at eleven o'clock in the evening. It was occasioned by an inflammatory affection of the throat, which did not last twenty-four hours." I could not help comparing in my own mind this modest statement with the bombastic "caps" and "displays" that would be made on such an occasion by a modern American journal. Poor George Washington! If his spirit is conscious of what is occurring here, how it must be disturbed to see in what frightful effigies and limning he is depicted, the most terrible of all being the gigantic statue in the Memorial Hall, by Guarnerio Pietro, the father of the country being "ride-a-cock-horse" on the American eagle.

The Japanese collection has by far the greatest novelties, for the reason that the natives of that country were not exhibitors, or I think very slightly, before the Vienna Show.

I hope that those pictures that the French have opened are not the best they intend to exhibit; and I am disappointed with the display of Belgian pictures: they will not compare with what they showed in Paris in 1867, nor with those that were visible at South Kensington during the recent annual exhibition. The sculptures of Italy seem to me for the most part very commonplace,—little boys taking off or putting on their shirts; little girls lifting their dresses, in consequence of being frightened by lizards or other reptiles. But, 'perhaps, the Italians know their market. I have watched very closely, and I have found that among the majority the art that attracts the most attention is that which figures the people of other nations. A Laplander in his sledge, with white cotton for snow; a Swedish couple in their wedding attire; a Norway clockmaker; a Swedish group, with the mother holding up a baby; and others of like character, give the utmost satisfaction. But between the American and the French Fine Arts Department is a case that does excite wondering admiration. It is "Cleopatra with her Family," from Greutzberg's Great Museum, Chestnut-street. Cleopatra is a semi-nude figure, with that idiotic expression which is always given by a moving wax-figure. Her breast heaves with her breathing, and a little bird on her hand flaps its wings. Shade of Madame Tussaud! did you ever aspire to the Royal Academy? I turn from this to a more modest and interesting evidence of civilisation, the collection sent by Queen Emma from Hawaii. Natural productions, inlaid wood, hats made from the arrowroot plant, and other objects,—evincing a strong desire in the youngest country not to be left behind in the world's progress.

There appears but very little English machinery; indeed, the space applied for is far from filled. The American machinery is most interesting, from its ingenuity.

The display of china, glass, and porcelain is very brilliant. The British are represented very slightly in the jewelry department; but it is made up in many other products which are novel in these parts. The Americans rejoice; but, at present, not in large numbers. The majority have never seen anything like it before, and therefore wonder. But amidst the applause of all the beauties, there comes the thought—"The paths of glory lead but to the grave." In the American department there is what I have never seen, certainly never noticed,—a collection of monuments and tombstones. While looking at this with astonishment, an attendant rushed from behind, and said: "You may take that card. I am here to advertise my business, and I guess every one is here doing the same. I have brought eleven large monuments, just to show the world what monuments are, and if our firm do not know what monuments are, nobody does. Are you a resident here?" "No; I'm from England." "Well, there is some of your stone, which we use a good deal of." "Yes—Aberdeen granite." "Do you come from Aberdeen?" "No; but I know the stone. How much," I added, "would a monument such as this cost?" "Well, that is one ordered by the son of General Blank, who fell in the war. The cost of that is 8,500 dollars, but I could give you as nice a monument as any man could wish for 10,000 dollars."

Those who have seen American ladies on the Continent would be surprised at the plain, even dowdy, dresses of those who visit the Centennial; but perhaps the beauty and fashion of New York have not yet made their pilgrimages to the shrine of industry and art.

On the Queen's birthday a scratch dinner was hastily got up by some of the exhibitors, and there could not have been a greater success. The speeches would have done honour to any assembly. The representatives of our colonies were most eloquent. It is no wonder that they are successful when such loyalty, good sense, and noble sentiments, are the attributes of those selected as their representatives. The speeches of Mr. Mackay, from Queensland, and Mr. Davenport, from South Australia, deserved something more than the brief notice which was the result of the copious notes taken by the reporters.

I have heard great objection raised to the term "Siegarland," which Germany applies to herself in displaying her mineral products.

Outside the building the amount of enterprise shown is marvellous. There is the Grand Exposition Hotel containing 1,325 rooms; the Globe, containing upwards of 1,100 rooms; the Transcontinental, with over 600 rooms. There is, at least, a mile of restaurants, drinking-bars, and cigar-stalls, all of which have been built up, and are to be "torn down" when the Exhibition has closed. The proprietors must have had a strong faith in the financial success of the undertaking. Will the moral success be great? That the Americans must be astonished at many things there is no doubt; but will the effect of these world-fair teachings be as great as elsewhere? I doubt it. They are a "*wegotistical*" people, and have an ingrained conceit arising from the absence of that moral courage which is the result of strong individual conviction. The majority absorb all opposing sentiment, and a man must glorify "our country" because he has been taught and encouraged to believe that no other country is its equal. Never having been able to compare, they have only one standard. These remarks do not apply to those Americans who have travelled; but they are an infinitesimal number compared to the masses who rule.

Æsthetics will have a hard struggle against the "dollar standard," the only one that is of universal application. This occurred in Waterer's rhododendron tent:—"Well, I guess these are 'elegant.' Where did they come from?" The attendant replied, "From England." Questioner, with much disappointment that they were not American, but with as much conceit as if the whole three millions of square miles of territory belonged to him,—"Why don't they grow in 'our country'?" "They do grow wild, and in this neighbourhood." "Then why don't 'we' show them as fine as these?" "Because you have no gardens." Here a lady struggled to the front, and said, "Will you tell me which are the finest?" "That depends upon your taste." "But, I mean which are the best." The attendant here saw she meant "dollar standard," and handed her a catalogue, the prices marked on which might aid her in the formation of her opinion.

The papers show how influential this standard is. One of them spoke with satisfaction of the progress the American department was making towards completion, and added that Messrs. So-and-So's case, which was empty last week, has now been filled with jewelry,—not copying or rivalling Cellini,—worth $500,000. A visitor has only to listen at any point where art is displayed to find this standard applied. The crowds that still collect before Frith's picture of the marriage of the Prince of Wales, would be diminished, or a like crowd would collect before any other picture, it does not matter which, if an announcement were made that the latter had been bought by one of "our" prominent citizens for, say, $50,000.

In speaking of these peculiarities, one is always met by the response: "Ah, we are a young country." This I have combated by telling many Americans that the plea is a weak one. They have existed for one hundred years, during which time Europe and the rest of the world have made more scientific and moral progress than for very many centuries before. The Americans have had the advantage of this. They did not spring out of the earth, void and without form, in 1776. They branched off from the civilisation that we then possessed. They inherited our experience and our traditions. They have had the benefit of our mechanical inventions oftentimes without acknowledgment or reward to the inventors. They have taken the offsprings of our authors' brains without pay. They have seen with what pains and with what satisfactory results we have amended our laws that were defective. "Conceit" has not stopped us in our onward progress, and corruption has been rooted out where it prevailed in any political institution. The founders of the American Constitution were of a different stamp from those who operate now. Washington was a gentleman, and had he been compelled to ride in a street-car the Constitution might have been less democratic. Are not the "deficiencies" that the President so slightly alluded to caused by a want of reform in the Constitution, and not by the inexperience and follies of youth?

Philadelphia. F. S. A.

THE PRINCIPLES AND APPLICATION OF THE THEORY OF THE TRUSS.*

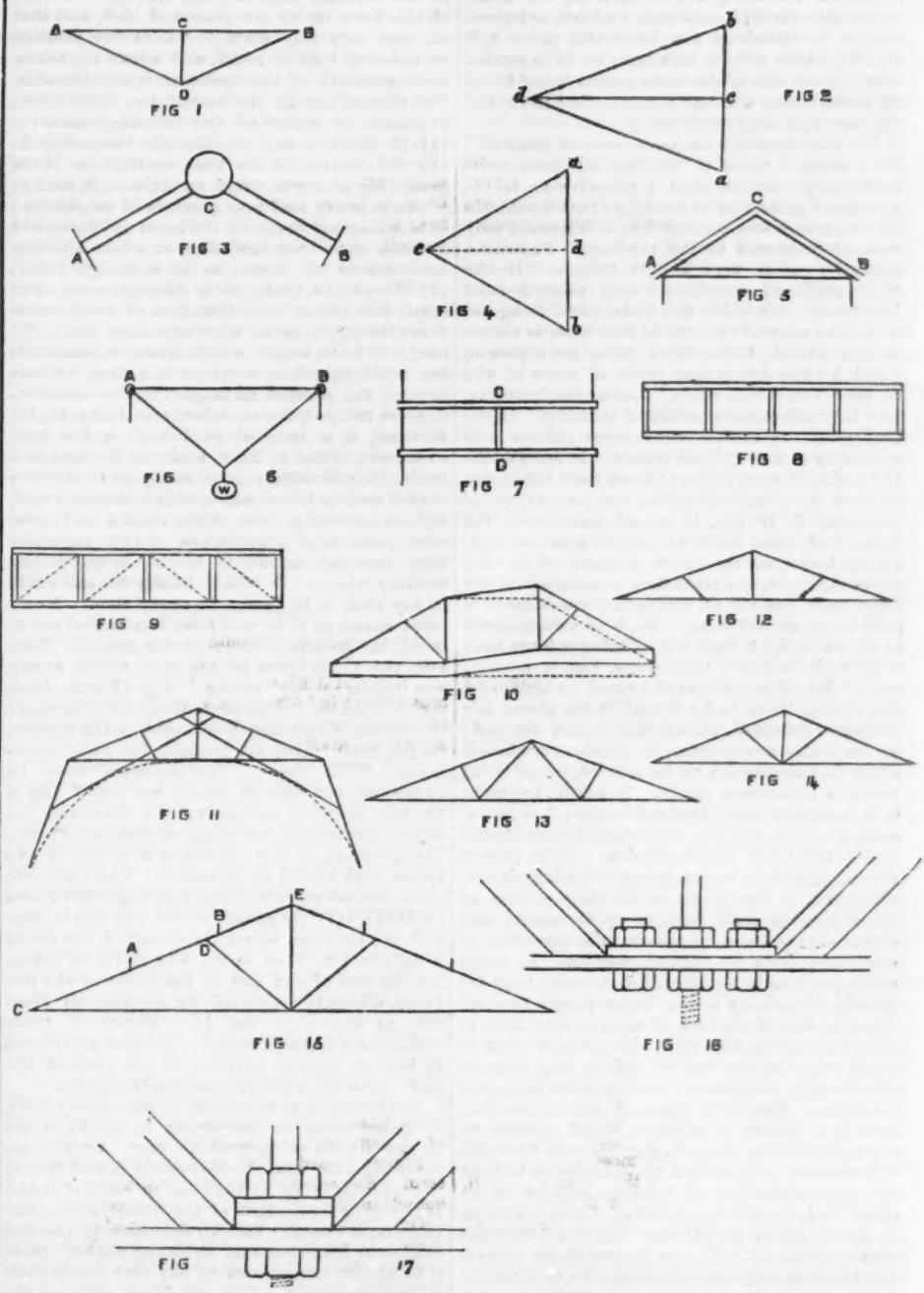
I VERILY believe that no one save the special correspondent of a daily paper would try to be eloquent on such a subject as trussing. An American writer has assured us that Shakspeare would never have attained to fame as a special correspondent of the *New York Herald*, because "he lacked the requisite fancy and imagination." Now, such a highly-gifted "special" as this remark suggests might probably see wonderful possibilities in my subject, but from the point of view of ordinary mortals, a truss is not a subject on which one can well wax eloquent. There is nothing supernatural about it, nor is it one of those things in general on which an eloquent lecturer might hope to awaken enthusiasm. Nevertheless, the subject of trussing is one of considerable interest, and at the present time is of increasing importance. It is a subject tolerably complete in itself, and one which, so far as I know, has not yet been fairly treated as an independent or distinct field of inquiry, so that, while much detached information is to be found in professional journals and in handbooks of construction, those general principles which govern all trussing, and which might fairly constitute it a complete branch of constructive science, have not, so far as I know, been brought together and presented to the student in their mutual relations as parts of a consistent theory of trussing. The student has, in short, rather been introduced to a collection of examples than to a set of principles. Now, of course it is impossible, in a half-hour's paper, to attempt anything like a complete or exhaustive treatment of the subject; I must, therefore, limit myself to the more elementary part of the subject,—to what I consider the fundamental principles of trussing, and a few of their simpler applications. I believe that no part of practical science is so much neglected in our professional education as

* From a paper read by Mr. W. W. Robertson before the Architectural Association, on the 2nd inst.

first principles; that there is no more fruitful cause of errors and mishaps and misapplied ingenuity than this neglect of general principles; and that nothing is more difficult than for those who are once fairly engaged with the details of a subject to turn back to its elements.

The general problem of building construction is, given certain external forces (pressure or loads), to transmit them safely to the ultimate support (the foundation). When we introduce the further condition that these pressures shall be transmitted to the ultimate support with the least expenditure of material which will ensure strength and, where that is necessary, *rigidity* in the structure employed, we enter the domain of scientific construction, wherein the perfect adaptation of the means to the end is aimed at, or, in other words, the application of that grand principle of economy which so conspicuously characterises all the works of nature. Now, if a load is to be carried between two vertical supports, there are three simple ways of doing it. Firstly, it may be supported by two inclined struts; secondly, it may be suspended by a chain; thirdly, it may be supported on a horizontal beam. These are the three great types of construction,—(1) the arch, (2) the chain, and (3) the lintel. Each possesses advantages and disadvantages. Comparing, first, the effects on the supports, we see that the lintel exerts only a vertical pressure, while the arch and chain exert oblique forces, requiring the expenditure of additional material to impart lateral stability to these vertical supports. Here, then, the advantage on the score of economy is with the lintel. Turning now to the bridging part of the structure, in the arch and chain the load produces only simple longitudinal stresses, viz., compression in the arch and tension in the chain, and this, as we shall presently see, is an economical application of material. But in the lintel the load acts transversely to the piece, and produces compound stresses which we need not stay here to analyse: it is sufficient to say that these forces exercise what is called a "bending movement" on the beam, and this, we shall see, is not by comparison an economical use of material.

Of course, an obvious point to be attended to in scientific—*i.e.*, economical—construction is so to use the materials, whatever they may be, as to subject them to those stresses only which they are best fitted to resist. Now, everybody knows that, whether the object to be attained is strength or rigidity, or both, the least economical mode of applying any material (even one of those which possess the greatest transverse strength)—the way in which the smallest possible resistance is obtained—is to subject the material to a transverse load; but few, perhaps, would realise this to its full extent without actual calculation. Let us take a case. There are only two classes of materials which possess considerable transverse strength, timber and metals. Take for an illustration a balk of yellow fir timber 10 in. square and 12 ft. long. If this balk be used as a strut or pillar, and subjected to a load of 40 tons, it will then only be loaded to about one-sixth of its breaking load, and will shorten under the load about one-twelfth of an inch. If the same balk be used as a tie, and subjected to the same load, it will then only be loaded to about one-fourteenth of its breaking load, and will lengthen under the load about one-twelfth of an inch. If, however, it be used as a beam to carry a load placed upon its centre, its breaking load is only 17 or 18 tons, and its deflection under (say) eight tons will be at least 1 in. This, then, which is not by any means an unfavourable example, shows how very materially less both the strength and the stiffness of a piece are under a transverse load than under a load acting lengthwise on the piece; and this is the point in which the lintel fails to realise the ideal of economical construction. Here, then, we have ascertained, from our comparison of these different constructive types, that the use of the arch or chain is favourable to economy in what we have called the bridging parts of the structure, but unfavourable to economy in the piers; while the use of the lintel is favourable to economy in the piers, but unfavourable to economy in the bridging parts of the structure,—*i.e.*, in the lintel itself; and we have further seen that the unfavourable element in each case is the application of a force which does not coincide with the lines of the structure, but is perpendicular or oblique to them, viz., an oblique pressure on the support, or a transverse load upon the beam. Now, the object of trussing is to get rid of both these unfavourable elements: Firstly, to get rid of transverse loads, to transform the bending action which the load or loads would exert on a beam into simple longitudinal forces in the several pieces of the truss, these pieces thus becoming either struts or ties; and, secondly, to transmit the pressures vertically to the supports. There are other qualities in a theoretically perfect truss which we may come to shortly; but, in the meantime, we note these two points in a perfect truss: that the load produces no transverse strain in any part, and that the pressure on the supports is vertical. By way of illustrating these qualities, I now ask your attention to the simplest possible cases of trussing. The truss is, perhaps, most naturally considered as a development of the beam or lintel; but it can be approached from other types of construction, and we shall therefore now proceed to truss the three typical examples we have already considered. Taking the beam first, what we want to do is to eliminate the transverse strains. With this object we introduce the vertical, C D (fig. 1), under the point at which the load is applied, and connect the foot of this piece with the ends of the beam by the inclined pieces, A D and D B. We have, by the addition of these pieces, transformed the beam into a truss. The load now produces no transverse strains. The truss consists of the strut C D in simple compression, the tie-rods A D and D B in simple tension, and the beam A B in simple compression; and we may ascertain the magnitude of these forces by constructing the stress-diagram shown in fig. 2, making $a\ b$ vertical and equal to the load, and making $c\ d$ parallel to A D, $d\ b$ parallel to D B, and $d\ c$ parallel to A B. Then the compressive force on C D = $a\ b$ = the load; the tensile force on A D and D B = that on $a\ d$ and $d\ c$ respectively; and the compressive force on A B = $d\ c$. The pressures on the supports at A and B remain vertical, of course, as before, and are equal to $a\ c$ and $b\ c$ respectively. We now proceed to the case of the two inclined struts (fig. 3). In such an arrangement the forces produced by the load are represented by the triangle $a\ b\ c$ (fig. 4), $a\ b$ being drawn vertical and made equal to the load, while $a\ c$, drawn parallel to A C, is = the compressive force in A C; and $b\ c$ drawn parallel to B C is = the compressive force in B C; while these same lines $a\ c$ and $b\ c$ represent also the oblique pressures against the supports at A and B. What we want to do is to change these oblique pressures into vertical pressures. Of course, in order to do this, all that is necessary is to introduce a tie from A to B (fig. 5), which shall take the lateral thrust of the struts, leaving only the vertical pressure to be borne by the supports. The effect of this is represented in the stress-diagram by the addition of the line $c\ d$ parallel to the tie, which line is then = the tensile force in the tie A B, while the vertical pressures on the supports A and B are represented by the lines $a\ d$ and $d\ b$ respectively; and this diagram shows very clearly how, by the introduction of the tie, the oblique pressure on the abutment ($a\ c$) is resolved into its vertical and horizontal components, the horizontal component being taken by the tie-beam and the vertical component only being transmitted to the support. It is not necessary to consider in detail the case of the chain, as it is so clearly the converse case to that we have just considered, with tensile forces in the parts instead of compressive; and, to



transform the oblique pressures on the abutments into vertical pressures, we have, as before, simply to introduce the horizontal piece A B (fig. 6), which will, in this case, be in compression, the amount of the compression being found by constructing a stress diagram similar to that we have just been considering.

If these illustrations have been as clear as I have desired them to be, they will have made sufficiently obvious what I conceive to be the two great principles of trussing; that it excludes all transverse strains, and that it transmits only vertical pressures to the supports. Principles generally seem very simple things. Unlike those profound questions which puzzled Lord Dundreary, any fellow can understand them, and as it is so natural to suppose that what is simple is also trivial, I fear that those principles on which I have dwelt may seem to some of you of very little real value. Let us see, however, how they affect the practice of trussing. In the first place, to exclude transverse strains it is necessary to use inclined braces. In each of the three simple examples which we have taken you will see that inclined pieces are present, and if the strut C D (fig. 1) placed underneath the beam had been made to rest on a second horizontal beam, as in fig. 7, instead of on the inclined braces, the transverse strains would not have been got rid of, but simply transferred in part to the second beam. Such an arrangement as shown in fig. 8 does not eliminate transverse strains; it is not a true truss, but a pseudo-truss. Introduce diagonal braces, as shown by the dotted lines in fig. 9, and, if the pieces are properly connected, the whole system is changed; we have now a true truss, in which each piece is either in compression or in tension, none being under a transverse strain. Not only, however, is it necessary to use inclined braces; it is necessary, to insure rigidity, that these braces should divide the truss into triangles. This rule is universal, and its reason is worth a minute's consideration. The joints in trussing seldom or never possess such rigidity as to oppose any effectual resistance to the angular deviation of any piece from its normal position. In many cases (such as in wrought-iron trusses) they are merely hinged by a pin being passed through them, so that if one end of a piece were free to alter its position, the other joint would offer in many cases no resistance, and in *any* case *no considerable* resistance, to an angular motion of the piece. Now in a frame of pieces thus connected a square or polygon would possess no angular stability of itself; it could only be stable if it were so surrounded by triangles as to have the angular position of a certain number of its sides fixed by forming parts of those triangles. It might be in equilibrium under a particular arrangement of load, but it would be what is known as unstable equilibrium,—an equilibrium which would be upset by any variation, accidental or otherwise, in the distribution of the load. The triangle alone is the figure which possesses in itself such perfect rigidity that, even with hinged joints, the figure can only be altered by means of lengthening or shortening one or more of the sides. This is the reason why the true truss possesses a rigidity which is entirely lacking in the pseudo-truss. The pseudo-truss consists of the repetition of a four-sided figure which possesses no rigidity of itself, and the sole elements of stiffness are the transverse strength of the two beams, and whatever resistance to angular deviation there may be in the joints of the frame. The true truss consists of a repetition of the triangle, and depends for rigidity not on any stiffness in the joints or transverse strength in the beams, but on the resistance of the parts to direct lengthening and shortening. There are occasional apparent exceptions to this rule that the bracing must divide a truss into triangles, but they are only apparent. For example, in the ordinary queen-post truss, the space between the queen-posts is very often a rectangle, and unbraced; but here there are two or three things to be noticed. Firstly, so long as the load on the two sides of the truss is symmetrical, the truss is in equilibrium, and there is no tendency to alteration in the form of the rectangle. Secondly, the variation of load which might occur, tending to cause alteration, is usually very slight. Thirdly, the tie-beam is usually continuous, and of such size that it would oppose considerable resistance to distortion into such a form as shown in fig. 10, which is the form it would necessarily take if the triangles remained rigid, and the rectangle altered in form. This analysis, however, enables us to see that it is really the transverse strength of the tie-beam that imparts rigidity to a truss of this form under a variation of load, and that we can only rely upon it where the possible variation of load is small, and where the transverse strength of the tie-beam is considerable. The rectangle must be braced, *i.e.*, divided into triangles, in either of the following cases:—(1) If there is any considerable inequality in the distribution of the load, or if there is the possibility of any material variation in it, such as where a heavy load (say portions of machinery) or of a floor are borne by the beam adjoining one queen-post and not the other, or where a rolling load has to be borne, as in a bridge truss; (2) Where the tie-beam is discontinuous, or of small dimensions, and therefore of small transverse strength, as in a wrought-iron roof. No one, it is to be hoped, would dream of constructing a wrought-iron truss of this form without bracing the central rectangle; but we occasionally see things quite as defective. In fig. 11, for instance, is a truss which I believe has been executed; it has at least been put forward as a model for execution. It is designed to obtain a curved ceiling in connexion with a Mansard roof, and, at a casual glance, might seem a fairly passable example of a roof-truss. A little examination, however, shows it to be radically and entirely wrong. It would hardly be too much to say that it is faulty in every line. Every piece seems as if it had been introduced not to avoid, but to multiply, transverse strains. Take even the upper part of the roof, which surely was "plain sailing" enough. Fig. 13 is the form which it takes. Struts are introduced to support the rafters where they are loaded by the purlins. So far, good. They are brought down on the tie-beam. What then? The tie-beam must be supported, and this is done; but how? By a vertical king-rod supporting the tie-beam, not where it is loaded, but at an intermediate point. The tie-beam, in fact, becomes a girder of two spans, each loaded at its centre. There are two most obvious ways in which this might have been avoided:—(1) By using two inclined ties to support the tie-beam where the thrust of the struts is delivered to it, as in fig. 13; or (2) by bringing the feet of the ties to the point of the tie-beam, which is supported by the vertical king-rod, as shown in fig. 14. Either of these well-known forms is sound. The ties introduced to impart angular stability to the parts of the roof below the curb are also badly applied.

Proceeding a step further in our inquiry, such an arrangement as that shown in fig. 15 is not by any means an uncommon one. By this arrangement the load is delivered at A and B, and the trussing is so applied as to leave C D and D E, the two segments of the rafter, still under transverse strains; and we occasionally see not dissimilar arrangements in larger works. Now, it is almost superfluous to say that this is radically unscientific. The object of trussing the rafter is to relieve it of transverse strains, and this can only be completely effected by placing the struts under the loads. In other words, to avoid transverse strains it is necessary that the loads, whether they are applied to the upper or lower member of the truss, should be at the apices of the trussing, not at intermediate points. Of course, in applying such a principle as this we must remember that it is only a means to an end, that end being sound and economical construction, and we must be careful that, in following out logically an undoubted principle, we do not lose sight of the elements which enter into the questions of soundness and economy. Thus, it is not merely by disposing the material in the most scientifically appropriate manner that economy is attained; there is the element of economy of workmanship, the question of how the multiplication of parts may affect the soundness of the structure by increasing the chance of hidden defects or defective fastenings; these and other such elements have all to be considered, and hence it follows that there are occasional cases where the advantages of a more complex form of truss are not sufficient to warrant the rejection of the simpler though less-scientifically-appropriate form. None the less is it necessary that the principle should be present to the mind of the constructor, common sense showing him when he should rigidly apply it, and when, by so doing, he would allow the means to defeat the end. To return of fig. 15, the span may be small and the rafter timber of comparatively large scantling; or the span may be larger and the rafter of wrought iron of comparatively small dimensions; and it is obvious that what may be a sufficient approximation to the ideal in one case may be a most unjustifiable departure from it in the other. As I said before, common sense is wanted in the application of the rule, but the rule itself is absolute, viz., that to avoid transverse strains it is necessary that the loads should be at the apices of the trussing.

Following one step further the idea of the exclusion of transverse strains, I would observe that it furnishes a guide to the proper construction of the joints of the truss, because, unless the axes of the several pieces which meet at a joint intersect in one point as nearly as the exigencies of connexion will admit, transverse strains are inevitably introduced, and the greater the deviation from the rule the greater the amount of the resulting bending movement. This, again, is specially important in wrought-iron trusses, where the scantlings of the pieces are so small that any considerable transverse force must seriously impair the strength of the truss. A joint such as that shown in fig. 16, for instance, which one occasionally sees in an iron truss, must necessarily be inferior to that shown in fig. 17, as violating this rule, and bringing a considerable transverse strain on the tie-rod,—a piece of small dimensions, and therefore of small transverse strength. Illustrations of this point might be drawn from nearly every joint in a truss, but I must pass on. Before leaving this question of transverse strain, I would note that there is one case, and only one case, in which transverse strains cannot be entirely got rid of, and that is where the load is not concentrated at certain points, but continuously distributed over the load-receiving member of the truss. In such a case transverse strains in that member cannot be altogether eliminated; but they are minimised by its subdivision into segments by the bays of the trussing; and how far, in such a case, this subdivision should be carried so as to reach the point of utmost economy and efficiency, but not to pass it, is one of the problems of the science of trussing. I will not trouble you with any observations on what I have advanced as the second great principle of the truss, viz., that it exerts only vertical pressure on the supports. This principle is, indeed, so plain as to be almost self-evident, and in few cases do we find it overlooked, if we except some Mediæval trusses, where the neglect was probably intentional, as a truss minus this quality is really a species of arch, depending for its stability on the lateral strength of the abutment, and therefore quite in accordance with the constructional *motif* of Mediæval architecture.

I have already trespassed so long on your patience, that, so far as the principles of trussing are concerned, I will do little more than mention one other principle, to which I ask your attention, viz., that the strength of the truss, and, therefore, the economy of the material, is directly as the depth of the truss. This is probably too well known to require proof, but any one can satisfy himself of it, and of the economy of material from increased depth, by working out the stresses in two examples of similar type but varying depths, and comparing the results, when it will be seen that the deeper the truss that is made, the less will be the strains in the parts. Of course, there is a limit to this: we cannot increase indefinitely the depth of a truss and indefinitely economise by so doing. In any case a point would ultimately be reached beyond which the additional length of the pieces would balance any diminution in sectional area; but there is another consideration which would generally become operative before that. Long struts—*i.e.*, struts whose lengths exceed a certain multiple of their diameters (from 10 to 20 for the materials generally used in trussing)—give way by bending sideways, and this tendency has to be met by the use of material to stiffen them beyond what is required to resist simple compression. The longer the strut the more the additional material required to meet this tendency; and the deeper the truss the longer the struts; and the limit of economy is reached when the additional material required to stiffen the long struts would compensate for or exceed the saving which would otherwise be effected by increasing the depth of the truss. I fear that this principle, that the strength of a truss is as its depth is not so universally recognised as its simplicity might lead us to expect. One still hears occasionally of timber beams trussed with wrought-iron within the depth of the beam,—a device which was in much favour a generation ago. Such a mode of attempting to strengthen a beam is a delusion and a snare. What little strength is obtained is obtained in the most extravagant and wasteful way, with a totally disproportionate

expenditure of material. It is, in fact, an eminently unscientific application of the truss.

The most economical angles for the bracing, and the relative economy of the different modes of bracing used in such trusses, have been made the subject of a theoretical investigation by Mr. Bindon Stoney, in his work on "Strains in Girders," and his results are as follow:—The most economical mode of bracing is that in which the braces are placed at the angle of 45°, thus dividing the truss into right-angled isosceles triangles; and if the quantity of material in the bracing of such a girder be taken as 100, the relative quantity in a Warren girder, where the angle the braces make with a vertical line is 30°, and where the triangles are therefore equilateral, is 115½; while in a girder with vertical and diagonal, or N bracing, the most economical angle for the inclined braces is 55° with the vertical, and the relative quantity of material in the bracing is 141½. Turning now to the crescent girder, and more especially to the bowstring girder, we note that the depth of the truss decreases from the centre to the ends very much as the bending moment does, and that consequently there is very little variation in the stresses in the different parts of the flanges; and as the upper flange is inclined, the shearing stress is transmitted mainly through it, and under a symmetrical load there is very little stress on the bracing. On the other hand, in roof-trusses with straight slopes to the roof, the depth of the truss decreases from the centre to the ends more rapidly than the bending moment, and consequently the stresses in what we may still call the flanges (viz., the rafters and main ties) increase from the centre to the ends of the truss, being greatest in those parts adjoining the walls, while in the bracing the stresses increase, on the whole, towards the centre of the truss. In these respects, therefore, these trusses present a complete contrast to trusses with parallel flanges, in which the stresses in the flanges increase towards the centre and in the bracing towards the end of the truss. It would have been very easy to write a paper, or, indeed, several papers, on this part of the subject, and upon those lattice trusses where more than one system of triangulation is used.

In conclusion, Mr. Robertson summarised the principles common to all forms of trussing, as follows:—The object of trussing is twofold. 1. To get rid of transverse strains; 2. To prevent oblique pressures on the supports. To get rid of transverse strains it is necessary to use inclined braces. To insure rigidity it is necessary that these braces divide the truss into triangles. To get rid of transverse strains the loads must be at the apices of the trussing. The axes of the pieces which meet at a joint must intersect in one point as far as possible. The strength, and therefore the economy of the truss is, within certain limits, proportional to its depth. Other things being equal, those trusses (if of any considerable magnitude), are the more economical in which the struts are the shorter.

THE ECCLESIASTICAL DILAPIDATIONS ACTS.

THE Select Committee appointed to inquire into the operation of the Ecclesiastical Dilapidations Acts of 1871 and 1872 have reported. The Committee, in order to meet complaints made by the clergy, suggest that if the present regulations are retained a large number of approved surveyors should be appointed in each diocese, from whom the two parties, the outgoing and incoming incumbent, may select one, or nominate their own surveyor; that the archdeacon, instead of the bishop, should be made the ecclesiastical officer for putting the Act into operation; that a power of appeal should be given to some competent local authority; that all fees to the bishop's secretary and registrar should be dispensed with; that a definite principle of assessment for dilapidations should be laid down; that loans of money to incumbents of small livings should be provided; that the periods allowed for repayment should be extended; and, to facilitate the arrangements for obtaining a final certificate, that greater powers should be given to Queen Anne's Bounty Board for advances in cases of structural dilapidations and small livings. If the present regulations are not maintained, the suggestion made by the Bishop of Peterborough, and approved in effect by other witnesses, is "to get rid of the present system of dilapidations altogether, and to substitute for it a fixed annual charge on each benefice, payable either to a Diocesan Dilapidation Board or to Queen Anne's Bounty Board, and that such Board should build, repair, and insure glebe houses and premises, the clergyman being, in return for his annual payment, free from all charges now known as dilapidations." It was also suggested that there should be a periodical survey of all glebe-houses; that secretaries' and registrars' fees should be abolished, and the business now done by them be transacted by a clerk at a fixed salary. The Committee are of opinion that the operation of the Act of 1871 has, in many respects, failed to accomplish the objects for which it was enacted; that it has provided no remedy for the most important complaint under the old law,—namely, the inability of the representatives of deceased incumbents to meet the amount assessed for dilapidations, but has cast upon new incumbents an obligation to pay over the amount, and attached also to them a liability for fees previously unknown to the law, and has deprived the clergy of all power of acting in their own matters, of choosing their own advisers, and of all practical appeal against the official surveyor appointed under the Act. They consider the machinery cumbersome and expensive, and that the requirements of the surveyors have in many cases exceeded the legal definition of ecclesiastical dilapidations.

PRIZES, GLASGOW INSTITUTE OF ARCHITECTS.

AT the last meeting of the Glasgow Institute of Architects,—Mr. John Baird, I.A., president, in the chair,—the distribution of prizes took place.

The President reminded the Institute that two years ago Mr. John J. Stevenson, architect, of Westminster, one of the original members of the Institute, presented a sum of money to be offered in prizes for competition amongst the young men employed in the offices of members in town. Accordingly, prizes were offered last year, and a very excellent competition was the result. Indeed, the drawings sent in were all of such superior merit that the only regret the council felt was that they had not a greater number of prizes to offer. Encouraged by the success of that competition, the council resolved this year to offer a gold medal for the best series of measured drawings and illustrative sketches from any municipal or domestic building in Scotland erected prior to the eighteenth century, to be competed for by draughtsmen and pupils in the offices of members of the Institute. For himself, he was anxious that apprentices should not be overlooked, and he offered a silver medal for the best series of drawings illustrating the south porch of the Crypt of St. Mungo's Cathedral, Glasgow, to be competed for only by pupils who, previously to the 1st of May last, had not been longer than five years in any architect's office. The competition for the apprentices' medal, he was glad to say, was very keen. No fewer than nine competitors entered, and all their drawings were exceedingly meritorious. Mr. Baird then presented the book prizes, the recipients being:—John Cumming, in the office of Mr. John Honeyman; William Millar, in the office of Messrs. Campbell Douglas & Sellar; and James Smith, in the office of Mr. John Gordon. The president's prize was awarded to William Preston, and bore the following inscription:—"Glasgow Institute of Architects. Incorporated 1868. President's Prize, 1876, for Apprentices Gained by Wm. Preston. John Baird, president."

HOLY TRINITY CHURCH, DORCHESTER, DORSET.

THE Church of the Holy and Undivided Trinity was re-opened on May 31st, after having been rebuilt, and nearly doubled in size. The site is a very awkward one as far as regards architectural appearance externally, for buildings at the east and west ends almost touch the church. The south side is practically the most unencumbered, and this faces the High-street. The old church consisted of a nave only, minus aisles, or the least attempt at a chancel. Ponderous galleries disfigured it, and the building was destitute of any pretensions to architectural beauty. This edifice has been pulled down, and a new structure has arisen out of its ashes. The present church consists of a nave, 61 ft. long, and 27 ft. 6 in. wide, with a north aisle, 13 ft. 6 in. wide, of the same length as the nave. There is also a south aisle, but not so wide, being 7 ft. 9 in. across, and in length 35 ft. The chancel is about 23 ft. long, and of the same breadth as the nave. On the north side of the latter is situate the vestry and organ-chamber. On the south side is an aisle of the same width as the south nave aisle. The new building accommodates 626 persons without being encumbered with any galleries. The walls are principally constructed of Pokeswell stone, the external dressings being partly of Portland stone from the old church, and of Box Ground, and internally of Corsham Down. The height of the nave up to the wall-plate is 22 ft. 3 in. The roofs to the nave and aisles are open ones, with principals at intervals, covered with boarding at the back. That to the chancel consists of a boarded and panelled ceiling, with carved gilded bosses at the intersections of the ribs. All the roofs are of deal, stained in two shades, and varnished. Externally, they are covered with Portmadoc slates, with red ridge tile roll. Moulded arches, carried on piers alternately octagonal and circular in plan, separate the nave and aisles; while a moulded arch, resting on slender Devonshire marble shafts, corbelled from piers, marks the division between the nave and chancel. At the west end a lofty gabled turret, containing the large bell from the old church, surmounts the gable of the nave, and is ornamentally corbelled out from it. In style the church may be said to be an adaptation of that of the Decorated period, and contains many traceried windows, the west one (the largest) having four lights.

The organ will not be finished till late in the autumn, and its case has been designed by the architect. The warming arrangements have been managed by Messrs. Haden & Son, of Trowbridge. The builders were Messrs. Tilley Bros., of Dorchester; and the architect is Mr. Ferrey, F.S.A. The total cost of the works amounts to nearly 4,000*l*.

GOOD ADVICE.

THE *Times* gives it thus:—"It is dangerous for any branch of art to be placed at the random discretion of possibly unskilful judges; but this is a danger to which some forms of art must be prepared, however unwillingly, to submit. Poetry or painting, or even sculpture, can keep clear of it. Architecture has no such choice. The material in which the architect works is very costly, and far beyond what his own private resources can supply. He is thus essentially a creature of patronage, since on no other terms can he obtain the means of exercising his art at all. There is a style of architecture, too, very excellent in its way, and capable of producing very grand effects, about which there is not the same room for difference of taste as there is in other artistic matters. The sort of building that fits in well with broad streets and fine open spaces, which produces its effect by combination rather than by the influence of each separate part, and which conveys, so to say, the same kind of message to every beholder,—this is at once the best suited for civic purposes and the most safely to be trusted in the hands of civic judges. The City guilds, with their wealth and known liberality, will, we trust, do much in the future, as they have done a little already in the past, for the ornamentation of our great metropolis. But we would remind their members, and the citizens of London generally, that each can in his own way lend aid to the common work. Every new shop or warehouse does something to help or to mar the general effect of London. The owners and designers of these may not have it in their power to burn a perfectly pure incense to the divinity of art, but they can at least present an acceptable offering at a lower, but not unworthy, shrine. They may do wisely in letting high art alone, but they need not, therefore, decline the duty of encouraging the style of architecture best suited to modern London."

Museums for the Thames Embankment. At the meeting of the Metropolitan Board of Works on the 2nd inst., on the motion of Mr. Richardson, the Board referred to the Works and General Purposes Committee a letter from the President of the Royal Colonial Institute, and the President of the Royal Asiatic Society, transmitting copy of a paper referring to the proposed establishment on a site (the property of the Crown) on the Victoria Embankment of two museums, one for India and the other for the Colonies; and urging this Board to relinquish their right to the roadway between the public garden and the site referred to, in order that the proposed museums may be brought close up to the garden.

THE LATE MR. BELLAMY, ARCHITECT.

We hear with regret of the death of Mr. Bellamy, one of the original founders of the Institute of Architects, in 1834. He died at his residence in Charlotte-street, Bedford-square, on Saturday night last, at the age of 76, after a long and painful illness. Amongst his works we call to mind, on the instant, Corsham-court, Wiltshire; King's College Hospital, London; and the Law Fire Insurance Office, Chancery-lane, the rear front of which was completed only just before his death.

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W. AUMONIER.

FIREPROOFING TIMBER.

WILL you favour me by inserting the following explanation as to a most important point in respect to the fireproofing of timber, and the observations Mr. Cates was kind enough to make on the work done in the dome of St. Paul's Cathedral? The mode I adopt in such cases is to provide a perfect insulation of the protecting stone felt sheeting from the timber to be protected, keeping a cavity between them through which the air circulates, thus preserving the timber better than when it is exposed or painted. It was only in the case of some of the dry timber supports or beams standing free in the interior that the material was laid to touch the timber, and this was done solely because the additional space of complete encircling cavities would have made the stanchions and other parts of the framework so bulky as to be unsightly. PHILIP BRANNON.

ST. PAUL'S.

SIR,—I think that what occurred at a meeting of the Grand Lodge, a few evenings ago, should be pressed upon the notice of the Dean and Chapter. You may have observed that a proposition to contribute 1,000*l.* towards the completion of St. Paul's, to commemorate the safe return of the Prince of Wales, was negatived, and that it was referred to a committee to consider in what more satisfactory way this donation might be employed.

Certainly the Dean and Chapter have no reason to be surprised if contributions are no longer forthcoming from public bodies, and if even some feeling of regret may now be felt by those who hurried to subscribe to an object which apparently they are never likely to see attempted. But if the Dean and Chapter feel incompetent to decide upon what should be done, there is no want of artistic taste and knowledge in the world to help them, if they will but condescend to ask for it. They need not always fail. If they announced that an impracticable and bizarre scheme had been sufficiently condemned, and that a simple rational treatment is desired, that would not shock Sir Christopher Wren, or lessen the monumental solemnity the building has acquired since his time, there can be no doubt that all that can advantageously be done might be completed in less than five years; and if more money were wanted, the Dean and Chapter would not then be holding quite the position they do at this moment in the eyes of the public. MASTER MASON.

HASTINGS WATER SUPPLY.

SIR,—Since my letter on the Hastings Water Supply, which you published in your paper of March 18th last, the subject has certainly been well ventilated, both in your columns and those of other journals. The *Lancet* gave a much worse account of the quality of the water than I ever ventured to do. Not half the remarks would have appeared in the public journals if it had not been for the persistency of the Hastings authorities in still declaring that the quality of the water was good. However, the contrary has been proved.

Some of the writers in the local papers, however, admit that the water supply is not what it should be; and they say further that myself and other people who find fault might at the same time suggest a remedy. I therefore would advise that the whole of the present supply should be properly filtered; each filter-bed having a layer of charcoal in it. Also that the water when so filtered should be stored in a covered reservoir or reservoirs.

This I should only consider as a temporary measure, till a supply of pure water is obtained from a distance. As to the permanent supply, and the locality to obtain it, I am doubtful about Glynde, as, though the green sand crops out there, it is the "upper edge," and the inclination of the strata falls away from Glynde.

My own idea is that a good supply, both as to quality and quantity, could be obtained by sinking wells in the neighbourhood of Robertsbridge, where the various streams rise that form the Rother river. Pumping stations should be erected here, to lift the water to high-service reservoirs in the neighbourhood, and the water could flow by gravitation to Hastings, and be stored in smaller covered service reservoirs on the heights near the town. THE VISITOR.

DRAINAGE OF HORSHAM.

SIR,—I should feel much obliged if you or any of your readers could inform me why nothing has been done in respect of the competitive schemes for the sewerage of the town of Horsham, in Sussex.

At the latter end of the month of March, I, in reply to an advertisement issued by the Local Board, sent in a scheme and estimate for the work—and I learn from paragraphs in local papers that fourteen plans were sent in, and the estimates varied from under 5,000*l.* to over 22,000*l.*

I can well imagine that such a diversity causes some perplexity to the members of the Board, who appear *not* to have called in professional aid to assist them in their selection.

Without assuming prophetic powers, I may venture to surmise that if the various schemes were submitted to the scrutiny of an able and experienced gentleman, it would be discovered that the higher estimates comprise much unnecessary work, and that the lowest sum is utterly inadequate to meet the requirements of the case.

Without such an opinion, the members of the Board must bear the odium and the blame if any unpleasant mistake or deficiency should hereafter come to light.

X.

HOT-WATER PIPES.

I HAVE for some time used hot water circulating from the kitchen boiler through iron pipes, with a galvanised iron cistern at the top supplied from a leaden cistern. The water is very hard and very soon stops the pipes, and the iron cistern soon rusts. I am going to substitute rain-water, which will not act as the hard water, but, I believe, rusts iron quickly; but as I cannot use lead I propose to pump the water through iron pipes. I must still use the galvanised iron cistern for the hot water. Will a similar cistern do for the cold water, or should it be slate? Will it be desirable to use galvanised pipes?

E. B.

Miscellanea.

The Salary of the City Architect.—At the discussion which took place in the Common Council, on the proposal of the Officers' and Clerks' Committee, that the salary of Mr. Horace Jones, the City architect, should be raised from 1,500*l.* to 2,250*l.* a year, to date from Midsummer, 1873, Mr. Roberts, in proposing the adoption of the committee's recommendation, said that the architect had saved the Corporation large sums of money, and done public work for which he was not paid, and that had they engaged another architect they would have had to pay for professional services 31,500*l.* An amendment, proposed by Mr. Fricker, to the effect that the salary of the architect be 2,000*l.* a year, to date from Christmas, 1875, gave rise to an animated debate, in the course of which several members spoke. The amendment was finally adopted, so that the architect's salary is raised to 2,000*l.* a year from Christmas last.

Co-operative Builders and Contractors. A meeting was held at the Artisans' Institute, Castle-street, W.C., last week, when Mr. M'Cormick, the manager of the National Co-operative Builders' and Contractors' Society delivered a lecture on "Co-operative Industry as applied to Building Operations." The Rev. H. Solly presided. Speeches were made by Mr. Hodgson Pratt, of the Workmen's Club and Institute Union, and Mr. James C. Lake, the chairman of the Society. At the close of the meeting a resolution was passed approving of the principles of the Society.

An Educational Conference will be held on the 23rd inst. by the Society of Arts to discuss the various means for promoting adult education.

The City Commissioners of Sewers *v.* Her Majesty's Commissioners of Works.—This was a summons taken out by the Commissioners of Sewers for the City of London under the Metropolitan Buildings Act, to recover 65*l.* 14*s.* for work done by order of the district surveyor in order to secure the building of the old Probate Court, which ran from Great Knightrider-street to Queen Victoria-street, and which was dangerous to the public. Mr. Poland appeared for the Commissioners of Sewers; and Mr. Hardy for the Commissioners of Works. It appeared that when Queen Victoria-street was formed, the wall of the old Probate Court, which abutted on that thoroughfare, was underpinned. On the 11th of May last, a police constable went to Mr. Power, the district surveyor, and told him that the bricks of one of the arches of that building had fallen into the road. He went down there and found, as the constable had stated, that bricks had fallen, and he ordered the wall to be shored up, the cost of which was 65*l.* 14*s.* Mr. Hardy said that he would admit that the bricks did fall, that the notices were properly served, and that the sum charged was a fair and proper charge to be made if the Commissioners of Sewers were entitled to recover at all. His defence was that the arch in question was only a surface arch of 4½ in. thick, and although the bricks fell that fact did not affect the stability of the wall, which was not a dangerous structure. It was underpinned by the Metropolitan Board of Works to meet the level of the street, and was, although an old wall, perfectly sound. Before the district surveyor called to inspect the premises the arch had been repaired, and the surveyor to the Commissioners of Works warned the district surveyor not to proceed with the work, as it was not necessary, the building not being a dangerous structure, and further that it was shortly to be pulled down. Evidence in support of this statement having been given, Sir Thomas White thought the district surveyor had acted precipitately, and dismissed the summons.

Municipal Buildings, Reading. — The ceremony of opening the new Municipal Buildings for the borough of Reading took place on the 6th inst. The site adjoins the old Town-hall. The buildings are from the design of Mr. Alfred Waterhouse, and the style of architecture is Gothic; the materials are local grey brick with red brick dressings, relieved with red terra cotta from the neighbourhood of Norwich. The principal feature in the structure is the entrance-tower, which now supersedes the old entrance to the Town-hall. It is 60 ft. high to the top cornice, and 100 ft. to the finials. The portion of the buildings facing the Market-place is three stories high, and that facing west two stories, with hall-keeper's residence above. The Council Chamber is 36 ft. long by 25 ft. and 24 ft. high, with a coved ceiling. In this room is a gallery for the public, the dimensions being 37 ft. by 12 ft. deep. Access to the tower is by a flight of steps 9 ft. wide. There are three doorways, two of which are for the public. In the building, offices are provided for the town clerk, the deputy town clerk, borough surveyor, medical officer of health, and four strong rooms for deeds and muniments. In the tower is a clock chamber for a *carillon* of bells arranged to play twenty-eight tunes, consisting of sacred, national, English, Irish, Scotch, and Welsh airs. An illuminated clock has been erected with a dial in each of the four quarters, and this with the bells has been provided by public subscription. The roof of the building is high pitched, and covered with tiles. The total cost is little under 10,000*l.* Messrs. Parnell & Sons, of Rugby, the contractors, have carried out the work.

Northern Architectural Association.—At an ordinary meeting of this society, held at the Old Castle, on Thursday, the 8th inst., Messrs. Prosser, Gibson Kyle, and W. Peachey were appointed delegates to the Architectural Conference, and to the Architectural Alliance, the meetings in connexion with which are to be held in London. Mr. Christian Waagepeterson and Mr. Neil Macara were elected associates, and Mr. Morton, of South Shields, was nominated a member. The secretary (Mr. Thos. Oliver) read a number of communications from various architectural societies, in reference to the forms of contract and general conditions used by them. After considerable discussion, it was resolved on the motion of Mr. James Hogg, to adjourn the further discussion upon the general conditions of contracts included in the draft and forwarded by the secretary to the Newcastle and Gateshead Builders' Association.

Society of Engineers:—At a meeting of the Society of Engineers, held on Monday evening, 12th inst., in the Society's hall, 6, Westminster Chambers, Victoria-street, Mr. V. Pendred, president, in the chair, a paper by Mr. Henry Davey on the underground pumping machinery at the Erin Colliery, Westphalia, was read. The paper described what is probably the largest example of underground pumping engines extant. The system, which was originated by the author, may thus be briefly described. In the mine (which is 1,200 ft. deep) 920 ft. from the surface is placed a pair of compound differential pumping-engines, capable of raising 1,400 gallons per minute to the surface, at the same time supplying power through the medium of the rising column to two differential hydraulic pumping-engines placed at the bottom of the mine, and employed in lifting 1,000 gallons per minute to the main engines. Steam is carried down to the main engines from the surface at a pressure of 70 lb. per square inch. After passing through the engines it is condensed, and a vacuum of from 24 in. to 26 in. of mercury is obtained by means of a separate condenser which produces at once the vacuum on the engine, and enables it to start to work against the full column.

"The Imperial Museum for India and the Colonies."—Mr. Forbes Watson has returned to the charge, and in a fresh pamphlet advocates the erection, side by side, on the old Fife House site on the Thames Embankment, of two independent museums,—one for India, and the other for the colonies; the Colonial Museum to consist of sections representing separately the principal colonies, provision being made at the same time for the India Library and for the establishment of a special Colonial Library and Reading-room; the buildings likewise to contain the rooms of the Royal Asiatic Society and of the Royal Colonial Institute. His contention is, that South Kensington, although well suited for an educational institution like the Science and Art Museum, is too far away from the centres of political and business life to allow of the India and Colonial Museums, if placed there, to be readily consulted by the classes directly interested in their accessibility.

Dover Harbour.—The Chancellor of the Exchequer, in reply to a question put by Sir G. Balfour in the House of Commons on the 29th ult., said that, in consequence of the report of the Select Committee of last session, from which it appeared that if the works at Dover Harbour were to be proceeded with, there would be strong reason for enlarging them, and therefore increasing the expense, the Bill prepared on the subject was laid aside for further consideration, and having reference to the other works and expenditure which the Government had in view, they did not find themselves able to bring forward a measure in the present year. With regard to harbour improvements generally for the protection of shipping, it was the policy of the Government to encourage by loans through the Public Works Loan Commissioners the construction of harbours of refuge.

Dis-turnpiked Roads.—The report of the Select Committee of Inquiry into the Turnpike Acts continuance was issued on the 29th ult. The committee express the opinion that no time ought to be lost in bringing dis-turnpiked roads under a better system of management, and that any legislation to be effective should be compulsory. The committee call attention to the fact that the Turnpike Acts Continuance Act of last session was for the first time not inserted among the public Acts of Parliament, and that public inconvenience has arisen in consequence, and recommended that no departure from this invariable practice of Parliament for upwards of thirty years should for the future be made. The committee give a list of the trusts which in their opinion should be allowed to expire on an early date.

Proposed New Gasworks for Leeds.—The gas committee of the Leeds Town Council have agreed to recommend the construction of new gasworks in New Wortley, and the works are to comprise a retort-house, 380 ft. long and 70 ft. wide, or accommodation for 288 retorts 20 ft. long, with 25 ft. of floor space in front of the retorts on each side. In connexion with the retort-house there will be coal-stores capable of holding 5,000 tons. Then there are to be condensers, engines, scrubbers, purifiers, two gasholders, &c. The capacity of the gasholders is to be 1,250,000 cubic feet each.

Patents for Inventions.—The Institution of Mechanical Engineers have presented a petition to the House of Commons against the Bill now before Parliament, wherein they say,—"Your petitioners, whilst not objecting to any amendments of the laws relating to patents for inventions which may be reasonably beneficial to the public at large, object on principle to such legislation as shall operate to prevent invention, or to deprive inventors of their just reward, or to render property in inventions insecure and in many cases worthless."

New Police Station at Northwich.—For a long time past the want of increased and more convenient accommodation has been seriously felt by the police authorities of Northwich. A new station has been built in Leicester-street by Mr. W. Leicester, of Northwich, from the designs of the late Mr. Nichols, county surveyor. The new building comprises an office, dwelling apartments for the inspector, a large room for magisterial business, a magistrate's retiring-room, and six roomy and well-ventilated cells, approached by a corridor.

Fresh Excavations at Troy.—M. Schliemann, it appears, has again gone to Troy, to make fresh researches. On the 5th ult. he received a firman authorising him to continue his excavations for two years, and on the 26th he commenced with 150 labourers. M. Schliemann hopes that among those who will be present at a part of his work will be the Right Hon. W. E. Gladstone, M.P. The "Treasure of Priam," found by M. Schliemann in his former researches, remains in the cellars of the Bank of Athens.

The Walker Art Gallery, Liverpool.—A meeting of the General Committee appointed to make arrangements for the opening of the Walker Art Gallery was held on the 30th ult. at the Town Hall. Letters were read from Mr. Warrington Wood and Mr. Alderman Walker, stating that the sculpture and bas-relief for the gallery could not be ready in time to admit of the opening of the gallery in September, as at first intended; and the committee decided to postpone the opening of the gallery till the beginning of next year.

The Lichfield City Surveyorship.—At a meeting of the Lichfield Town Council, on the 30th ult., the Mayor reported that the Sub-Street Committee had met the trustees of the Conduit Lands, and had elected Mr. George Robinson, of Stroud, an inspector and surveyor. Four candidates were selected from the applicants, but Mr. Davoll retired, and Mr. Nevill declined to comply with the conditions regulating his duties. The other two were Mr. Robinson and Mr. Meakin, of Hanley. The appointment was confirmed.

Hampton Court Bridge.—The Metropolitan Board of Works have agreed to loan to the Kew and other Bridges Committee the sum of 40,000*l.*, at 3*l.* 15*s.* per cent. interest. This will, together with 20,000*l.* which the Corporation of London proposed to loan to the same body, enable them to free from toll Hampton Court Bridge over the Thames and the two bridges over the River Lea,—Chingford and Tottenham Mills,—thus completing the task set the committee in the Act of Parliament calling them into existence.

Researches in Asia Minor.—Mr. Pullan has brought together, at No. 7, Argyll-place, a number of drawings and photographs illustrating the progress of various late researches in Asia Minor, in which he has been engaged. The collection includes designs by several hands for the restoration of the Tomb of Mausolus (otherwise the Mausoleum), and we should say more about it but for the more than usual pressure on our space.

New House, Biggleswade, Beds.—The foundation-stone of a new mansion was laid a few days ago in the Park. The ceremony was performed by Mrs. Shuttleworth. The new house, which occupies the site of the old one previously belonging to Lord Ongly, is being built by Messrs. W. Cubitt & Co., London, from designs by Mr. H. Clutton. Mr. W. Bennison is clerk of works.

New Chancel at St. Mary's Church, Brighton.—This week Messrs. E. Nash & Co., of Brunswick-street East, and Farman-street, Hove, have commenced to erect a new and enlarged apsidal chancel for St. Mary's Church, St. James's-street, Brighton, the previous one having been inadequate to the requirements of the congregation. Mr. W. Emerson is the architect.

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W. AUMONIER.

FIREPROOFING TIMBER.

WILL you favour me by inserting the following explanation as to a most important point in respect to the fireproofing of timber, and the observations Mr. Cates was kind enough to make on the work done in the dome of St. Paul's Cathedral? The mode I adopt in such cases is to provide a perfect insulation of the protecting stone felt sheeting from the timber to be protected, keeping a cavity between them through which the air circulates, thus preserving the timber better than when it is exposed or painted. It was only in the case of some of the dry timber supports or beams standing free in the interior that the material was laid to touch the timber, and this was done solely because the additional space of complete encircling cavities would have made the stanchions and other parts of the framework so bulky as to be unsightly.

PHILIP BRANNON.

ST. PAUL'S.

SIR,—I think that what occurred at a meeting of the Grand Lodge, a few evenings ago, should be pressed upon the notice of the Dean and Chapter. You may have observed that a proposition to contribute 1,000*l.* towards the completion of St. Paul's, to commemorate the safe return of the Prince of Wales, was negatived, and that it was referred to a committee to consider in what more satisfactory way this donation might be employed.

Certainly the Dean and Chapter have no reason to be surprised if contributions are no longer forthcoming from public bodies, and if even some feeling of regret may now be felt by those who hurried to subscribe to an object which apparently they are never likely to see attempted. But if the Dean and Chapter feel incompetent to decide upon what should be done, there is no want of artistic taste and knowledge in the world to help them, if they will but condescend to ask for it. They need not always fail. If they announced that an impracticable and bizarre scheme had been sufficiently condemned, and that a simple rational treatment is desired, that would not shock Sir Christopher Wren, or lessen the monumental solemnity the building has acquired since his time, there can be no doubt that all that can advantageously be done might be completed in less than five years; and if more money were wanted, the Dean and Chapter would not then be holding quite the position they do at this moment in the eyes of the public.

MASTER MASON.

HASTINGS WATER SUPPLY.

SIR,—Since my letter on the Hastings Water Supply, which you published in your paper of March 18th last, the subject has certainly been well ventilated, both in your columns and those of other journals. The *Lancet* gave a much worse account of the quality of the water than I ever ventured to do. Not half the remarks would have appeared in the public journals if it had not been for the persistency of the Hastings authorities in still declaring that the quality of the water was good. However, the contrary has been proved.

Some of the writers in the local papers, however, admit that the water supply is not what it should be; and they say further that myself and other people who fled fault might at the same time suggest a remedy. I therefore would advise that the whole of the present supply should be properly filtered; each filter-bed having a layer of charcoal in it. Also that the water when so filtered should be stored in a covered reservoir or reservoirs.

This I should only consider as a temporary measure, till a supply of pure water is obtained from a distance. As to the permanent supply, and the locality to obtain it, I am doubtful about Glynde, as, though the green sand crops out there, it is the "upper edge," and the inclination of the strata falls away from Glynde.

My own idea is that a good supply, both as to quality and quantity, could be obtained by sinking wells in the neighbourhood of Robertsbridge, where the various streams rise that form the Rother river. Pumping stations should be erected here, to lift the water to high-service reservoirs in the neighbourhood, and the water could flow by gravitation to Hastings, and be stored in smaller covered service reservoirs on the heights near the town.

THE VISITOR.

DRAINAGE OF HORSHAM.

SIR,—I should feel much obliged if you or any of your readers could inform me why nothing has been done in respect of the competitive schemes for the sewerage of the town of Horsham, in Sussex.

At the latter end of the month of March, I, in reply to an advertisement issued by the Local Board, sent in a scheme and estimate for the work—and I learn from paragraphs in local papers that fourteen plans were sent in, and the estimates varied from under 5,000*l.* to over 22,000*l.*

I can well imagine that such a diversity causes some perplexity to the members of the Board, who appear not to have called in professional aid to assist them in their selection.

Without assuming prophetic powers, I may venture to surmise that if the various schemes were submitted to the scrutiny of an able and experienced gentleman, it would be discovered that the higher estimates comprise much unnecessary work, and that the lowest sum is utterly inadequate to meet the requirements of the case.

Without such an opinion, the members of the Board must bear the odium and the blame if any unpleasant mistake or deficiency should hereafter come to light.

X.

HOT-WATER PIPES.

I HAVE for some time used hot water circulating from the kitchen boiler through iron pipes, with a galvanised iron cistern at the top supplied from a leaden cistern. The water is very hard and very soon stops the pipes, and the iron cistern soon rusts. I am going to substitute rain-water, which will not act as the hard water, but, I believe, rusts iron quickly; but as I cannot use lead I propose to pump the water through iron pipes. I must still use the galvanised iron cistern for the hot water. Will a similar cistern do for the cold water, or should it be slate? Will it be desirable to use galvanised pipes?

R. B.

Miscellanea.

The Salary of the City Architect.—At the discussion which took place in the Common Council, on the proposal of the Officers' and Clerks' Committee, that the salary of Mr. Horace Jones, the City architect, should be raised from 1,500*l.* to 2,250*l.* a year, to date from Midsummer, 1873, Mr. Roberts, in proposing the adoption of the committee's recommendation, said that the architect had saved the Corporation large sums of money, and done public work for which he was not paid, and that had they engaged another architect they would have had to pay for professional services 31,500*l.* An amendment, proposed by Mr. Fricker, to the effect that the salary of the architect be 2,000*l.* a year, to date from Christmas, 1875, gave rise to an animated debate, in the course of which several members spoke. The amendment was finally adopted, so that the architect's salary is raised to 2,000*l.* a year from Christmas last.

Co-operative Builders and Contractors. A meeting was held at the Artisans' Institute, Castle-street, W.C., last week, when Mr. M'Cormick, the manager of the National Co-operative Builders' and Contractors' Society delivered a lecture on "Co-operative Industry as applied to Building Operations." The Rev. H. Solly presided. Speeches were made by Mr. Hodgson Pratt, of the Workmen's Club and Institute Union, and Mr. James C. Lake, the chairman of the Society. At the close of the meeting a resolution was passed approving of the principles of the Society.

An Educational Conference will be held on the 23rd inst. by the Society of Arts to discuss the various means for promoting adult education.

The City Commissioners of Sewers *v.* **Her Majesty's Commissioners of Works.**—This was a summons taken out by the Commissioners of Sewers for the City of London under the Metropolitan Buildings Act, to recover 65*l.* 14*s.* for work done by order of the district surveyor in order to secure the building of the old Probate Court, which ran from Great Knightrider-street to Queen Victoria-street, and which was dangerous to the public. Mr. Poland appeared for the Commissioners of Sewers; and Mr. Hardy for the Commissioners of Works. It appeared that when Queen Victoria-street was formed, the wall of the old Probate Court, which abutted on that thoroughfare, was underpinned. On the 11th of May last, a police constable went to Mr. Power, the district surveyor, and told him that the bricks of one of the arches of that building had fallen into the road. He went down there and found, as the constable had stated, that bricks had fallen, and he ordered the wall to be shored up, the cost of which was 65*l.* 14*s.* Mr. Hardy said that he would admit that the bricks did fall, that the notices were properly served, and that the sum charged was a fair and proper charge to be made if the Commissioners of Sewers were entitled to recover at all. His defence was that the arch in question was only a surface arch of 4½ in. thick, and although the bricks fell that fact did not affect the stability of the wall, which was not a dangerous structure. It was underpinned by the Metropolitan Board of Works to meet the level of the street, and was, although an old wall, perfectly sound. Before the district surveyor called to inspect the premises the arch had been repaired, and the surveyor to the Commissioners of Works warned the district surveyor not to proceed with the work, as it was not necessary, the building not being a dangerous structure, and further that it was shortly to be pulled down. Evidence in support of this statement having been given, Sir Thomas White thought the district surveyor had acted precipitately, and dismissed the summons.

Municipal Buildings, Reading. — The ceremony of opening the new Municipal Buildings for the borough of Reading took place on the 6th inst. The site adjoins the old Town-hall. The buildings are from the design of Mr. Alfred Waterhouse, and the style of architecture is Gothic; the materials are local grey brick with red brick dressings, relieved with red terra cotta from the neighbourhood of Norwich. The principal feature in the structure is the entrance-tower, which now supersedes the old entrance to the Town-hall. It is 60 ft. high to the top cornice, and 100 ft. to the finials. The portion of the buildings facing the Market-place is three stories high, and that facing west two stories, with hall-keeper's residence above. The Council Chamber is 36 ft. long by 25 ft. and 24 ft. high, with a coved ceiling. In this room is a gallery for the public, the dimensions being 37 ft. by 12 ft. deep. Access to the tower is by a flight of steps 9 ft. wide. There are three doorways, two of which are for the public. In the building, offices are provided for the town clerk, the deputy town clerk, borough surveyor, medical officer of health, and four strong rooms for deeds and muniments. In the tower is a clock chamber for a *carillon* of bells arranged to play twenty-eight tunes, consisting of sacred, national, English, Irish, Scotch, and Welsh airs. An illuminated clock has been erected with a dial in each of the four quarters, and this with the bells has been provided by public subscription. The roof of the building is high pitched, and covered with tiles. The total cost is little under 10,000*l.* Messrs. Parnell & Sons, of Rugby, the contractors, have carried out the work.

Northern Architectural Association.—At an ordinary meeting of this society, held at the Old Castle, on Thursday, the 8th inst., Messrs. Prosser, Gibson Kyle, and W. Peachey were appointed delegates to the Architectural Conference, and to the Architectural Alliance, the meetings in connexion with which are to be held in London. Mr. Christian Waagepeterson and Mr. Neil Macara were elected associates, and Mr. Morton, of South Shields, was nominated a member. The secretary (Mr. Thos. Oliver) read a number of communications from various architectural societies, in reference to the forms of contract and general conditions used by them. After considerable discussion, it was resolved on the motion of Mr. James Hogg, to adjourn the further discussion upon the general conditions of contracts included in the draft and forwarded by the secretary to the Newcastle and Gateshead Builders' Association.

Society of Engineers:—At a meeting of the Society of Engineers, held on Monday evening, 12th inst., in the Society's hall, 6, Westminster Chambers, Victoria-street, Mr. V. Pendred, president, in the chair, a paper by Mr. Henry Davey on the underground pumping machinery at the Erin Colliery, Westphalia, was read. The paper described what is probably the largest example of underground pumping engines extant. The system, which was originated by the author, may thus be briefly described. In the mine (which is 1,200 ft. deep) 920 ft. from the surface is placed a pair of compound differential pumping-engines, capable of raising 1,400 gallons per minute to the surface, at the same time supplying power through the medium of the rising column to two differential hydraulic pumping-engines placed at the bottom of the mine, and employed in lifting 1,000 gallons per minute to the main engines. Steam is carried down to the main engines from the surface at a pressure of 70 lb. per square inch. After passing through the engines it is condensed, and a vacuum of from 24 in. to 26 in. of mercury is obtained by means of a separate condenser which produces at once the vacuum on the engine, and enables it to start to work against the full column.

"The Imperial Museum for India and the Colonies."—Mr. Forbes Watson has returned to the charge, and in a fresh pamphlet advocates the erection, side by side, on the old Fife House site on the Thames Embankment, of two independent museums,—one for India, and the other for the colonies; the Colonial Museum to consist of sections representing separately the principal colonies, provision being made at the same time for the India Library and for the establishment of a special Colonial Library and Reading-room; the buildings likewise to contain the rooms of the Royal Asiatic Society and of the Royal Colonial Institute. His contention is, that South Kensington, although well suited for an educational institution like the Science and Art Museum, is too far away from the centres of political and business life to allow of the India and Colonial Museums, if placed there, to be readily consulted by the classes directly interested in their accessibility.

Dover Harbour.—The Chancellor of the Exchequer, in reply to a question put by Sir G. Balfour in the House of Commons on the 29th ult., said that, in consequence of the report of the Select Committee of last session, from which it appeared that if the works at Dover Harbour were to be proceeded with, there would be strong reason for enlarging them, and therefore increasing the expense, the Bill prepared on the subject was laid aside for further consideration, and having reference to the other works and expenditure which the Government had in view, they did not find themselves able to bring forward a measure in the present year. With regard to harbour improvements generally for the protection of shipping, it was the policy of the Government to encourage by loans through the Public Works Loan Commissioners the construction of harbours of refuge.

Dis-turnpiked Roads.—The report of the Select Committee of Inquiry into the Turnpike Acts continuance was issued on the 29th ult. The committee express the opinion that no time ought to be lost in bringing dis-turnpiked roads under a better system of management, and that any legislation to be effective should be compulsory. The committee call attention to the fact that the Turnpike Acts Continuance Act of last session was for the first time not inserted among the public Acts of Parliament, and that public inconvenience has arisen in consequence, and recommended that no departure from this invariable practice of Parliament for upwards of thirty years should for the future be made. The committee give a list of the trusts which in their opinion should be allowed to expire on an early date.

Proposed New Gasworks for Leeds.—The gas committee of the Leeds Town Council have agreed to recommend the construction of new gasworks in New Wortley, and the works are to comprise a retort-house, 380 ft. long and 70 ft. wide, or accommodation for 288 retorts 20 ft. long, with 25 ft. of floor space in front of the retorts on each side. In connexion with the retort-house there will be coal-stores capable of holding 5,000 tons. Then there are to be condensers, engines, scrubbers, purifiers, two gasholders, &c. The capacity of the gasholders is to be 1,250,000 cubic feet each.

Patents for Inventions.—The Institution of Mechanical Engineers have presented a petition to the House of Commons against the Bill now before Parliament, wherein they say,—"Your petitioners, whilst not objecting to any amendments of the laws relating to patents for inventions which may be reasonably beneficial to the public at large, object on principle to such legislation as shall operate to prevent invention, or to deprive inventors of their just reward, or to render property in inventions insecure and in many cases worthless."

New Police Station at Northwich.—For a long time past the want of increased and more convenient accommodation has been seriously felt by the police authorities of Northwich. A new station has been built in Leicester-street by Mr. W. Leicester, of Northwich, from the designs of the late Mr. Nichols, county surveyor. The new building comprises an office, dwelling apartments for the inspector, a large room for magisterial business, a magistrate's retiring-room, and six roomy and well-ventilated cells, approached by a corridor.

Fresh Excavations at Troy.—M. Schliemann, it appears, has again gone to Troy, to make fresh researches. On the 5th ult. he received a firman authorising him to continue his excavations for two years, and on the 26th he commenced with 150 labourers. M. Schliemann hopes that among those who will be present at a part of his work will be the Right Hon. W. E. Gladstone, M.P. The "Treasure of Priam," found by M. Schliemann in his former researches, remains in the cellars of the Bank of Athens.

The Walker Art Gallery, Liverpool.—A meeting of the General Committee appointed to make arrangements for the opening of the Walker Art Gallery was held on the 30th ult. at the Town Hall. Letters were read from Mr. Warrington Wood and Mr. Alderman Walker, stating that the sculpture and bas-relief for the gallery could not be ready in time to admit of the opening of the gallery in September, as at first intended; and the committee decided to postpone the opening of the gallery till the beginning of next year.

The Lichfield City Surveyorship.—At a meeting of the Lichfield Town Council, on the 30th ult., the Mayor reported that the Sub-Street Committee had met the trustees of the Conduit Lands, and had elected Mr. George Robinson, of Stroud, an inspector and surveyor. Four candidates were selected from the applicants, but Mr. Davoll retired, and Mr. Nevill declined to comply with the conditions regulating his duties. The other two were Mr. Robinson and Mr. Meakin, of Hanley. The appointment was confirmed.

Hampton Court Bridge.—The Metropolitan Board of Works have agreed to loan to the Kew and other Bridges Committee the sum of 40,000*l.*, at 3*l.* 15*s.* per cent. interest. This will, together with 20,000*l.* which the Corporation of London proposed to loan to the same body, enable them to free from toll Hampton Court Bridge over the Thames and the two bridges over the River Lea,—Chingford and Tottenham Mills,—thus completing the task set the committee in the Act of Parliament calling them into existence.

Researches in Asia Minor.—Mr. Pullan has brought together, at No. 7, Argyll-place, a number of drawings and photographs illustrating the progress of various late researches in Asia Minor, in which he has been engaged. The collection includes designs by several hands for the restoration of the Tomb of Mausolus (otherwise the Mausoleum), and we should say more about it but for the more than usual pressure on our space.

New House, Biggleswade, Beds.—The foundation-stone of a new mansion was laid a few days ago in the Park. The ceremony was performed by Mrs. Shuttleworth. The new house, which occupies the site of the old one previously belonging to Lord Ongly, is being built by Messrs. W. Cubitt & Co., London, from designs by Mr. H. Clutton. Mr. W. Bennison is clerk of works.

New Chancel at St. Mary's Church, Brighton.—This week Messrs. E. Nash & Co., of Brunswick-street East, and Farman-street, Hove, have commenced to erect a new and enlarged apsidal chancel for St. Mary's Church, St. James's-street, Brighton, the previous one having been inadequate to the requirements of the congregation. Mr. W. Emerson is the architect.

Pulpit, Carnmoney.—There has just been completed in the parish church of Carnmoney a pulpit, erected by Mrs. Thomson, of Low-wood, in memory of her late husband. It is of Caen stone, in fine panels, each panel having an appropriate floral emblem, with an illuminated text on a scroll. The ground work of the panels is gilt. The pulpit is from a design by Mr. Drew, and the work was entrusted to Mr. A. P. Sharp, of Great Brunswick-street, Dublin. A brass plate set into the base of the pulpit bears an inscription.

Newcastle-under-Lyme Borough Surveyorship.—A meeting of the above Town Council was held on the 2nd instant, for the purpose of electing a surveyor. There were nearly forty applicants, from whom five were selected to attend, viz., Mr. Frost, Hanley; Mr. Pearce, Liverpool; Mr. Taylor, Rochdale; Mr. Eayrs, Llanelly; and Mr. Winship, Malvern. Eventually Mr. John T. Eayrs, assistant surveyor at Llanelly, was appointed.

TENDERS

For new stabling and groom's house at Reading, for Messrs. Sutton & Sons. Messrs. W. & G. T. Brown & F. W. Albury, architects:—

Hill, Higgs, & Hill	£3,090	0	0
Sheppard	2,824	0	0
Elliott	2,806	0	0
Searle	2,800	0	0
Rider & Son (accepted)	2,778	0	0

For the erection of Welsh Presbyterian Chapel, Seacombe. Mr. R. G. Thomas, architect:—

Jones (accepted)	£2,650	0	0

For two new houses, shops, &c., in rear of the Salmon and Compasses, Penton-street, Islington, for Mr. C. W. Avis. Mr. T. H. Watson, architect:—

Batchelor	£2,876	0	0
Carr & Sons	2,335	0	0
Langmead & Way	2,317	0	0
Kelly, Bros.	2,293	0	0
Bentley	2,261	0	0
Marr (accepted)	2,167	0	0

Accepted for three houses to be erected in the Grand Avenue, West Brighton. Mr. I. Thomas, architect. Quantities by Mr. A. Farr:—

(A) Chappell	£3,000	0	0
(B) Chappell	2,343	0	0
(C) Chappell	2,857	0	0

For new conservatory and offices, Gloucester-road, for Dr. Sutton Townsend:—

Lascelles	£710	0	0
Grimwood & Sons	694	0	0

For sundry internal works to the *Morning Advertiser* office, 127, Fleet-street. Mr. W. Nunn, architect:—

Grimwood & Sons (accepted).

For the erection of the Gresham Life Assurance Offices Poultry, City:—

Scrivener & White	£47,980	0	0
Trollope & Son	47,900	0	0
Smith & Co.	47,713	0	0
Dove, Bros.	47,255	0	0
Colls	46,434	0	0
Hill, Higgs, & Hill	43,680	0	0
Kilby	40,730	0	0
Peto, Bros.	40,497	0	0

For repairs, painting, &c., at 45, Kensington Park-gardens. Mr. C. N. Beazley, architect:—

Smith	£247	10	0
Cowland	239	0	0
Staines & Son (accepted)	214	0	0

For new warehouse, at Waddon Steam Flour Mills, Croydon, Surrey, for Messrs. Charles Brown & Co. Messrs. George Elkington & Son, architects:—

Browne & Robinson	£1,870	0	0
Coleman	1,785	0	0
Rider & Son	1,768	0	0
Lathey, Brothers	1,730	0	0
Kingland	1,644	0	0

For Primitive Methodist chapel, Stapleton-road, Bristol. Mr. Alfred Harford, architect. Quantities supplied:—

	No. 1.			No. 2.		
Howell	£1,468	0	0	£620	0	0
Stephens & Bastow	2,408	8	7	611	4	6
Veals	2,350	0	0	475	0	0
Holbrow (accepted).	2,006	0	0	467	10	0

For St. Andrew's Schools, Montpelier. Messrs. Pope & Paul, architects. Quantities not supplied:—

Dubin	£346	0	0!
Davis & Son	270	0	0
Humphrey	247	10	0
Beaven & Son	220	0	0
Williams & Son	215	0	0
Stephens & Bastow	197	0	0
Box	170	0	0
Baker & Son	165	0	0!

For chapel at Nazing. Messrs. Lander & Bedells, architects. Quantities supplied:—

Ebbage	£1,240	0	0
Grover	1,037	0	0
Bentley	1,025	0	0
Clarke	950	0	0
Hampton	916	0	0

For the erection of stables, Black Horse-yard, Westminster. Mr. H. Lovegrove, architect:—

Scrivener & White	£497	0	0
Hobson	496	0	0
Veare	491	0	0
Bishop & Hooper	460	0	0
Holliday (accepted)	427	0	0

For a pair of villa residences, and stabling to each, at Hornsey-lane, for Mr. T. Mattinson. Messrs. Lander & Bedells, architects. Quantities supplied:—

Southcott	£3,991	0	0
Axford	3,887	0	0
Ebbage	3,837	0	0
Carter	3,820	0	0
Kerry	3,815	0	0
Brass	3,810	0	0
Grover	3,787	0	0
Kelly	3,775	0	0
Williams & Son	3,732	0	0

For rebuilding warehouse, Addle-street, City. Messrs. Ford & Hesketh, architects:—

Crabb (accepted)	£2,000	0	0

For rebuilding warehouse, Wood-street, City. Messrs. Ford & Hesketh, architects:—

Nightingale	£4,992	0	0
Hobson	4,965	0	0
Peto, Brothers	4,924	0	0
Lawrance	4,814	0	0
Kirk & Randall	4,793	0	0
Ashby, Brothers	4,769	0	0
Downs & Co.	4,758	0	0
Adamson & Sons	4,754	0	0
Scrivener & White	4,696	0	0
Browne & Robinson	4,611	0	0
Brass (accepted)	4,596	0	0

For two semi-detached villa residences at Highbury-vale, for Mr. J. Gibson:—

Bird	£2,340	0	0
Clark	2,210	0	0
Wilson	2,190	0	0
National Co-operative Builders and Contractors' Society	2,150	0	0
Richards	2,090	0	0

For school buildings at Whitstable, for the Whitstable and Seasalter (U.D.) School Board. Messrs. Morris & Stallwood, architects:—

Webber	£5,535	0	0
Featherstone & Lucas	5,199	0	0
Knight	5,128	0	0
Bingham	4,981	0	0
Lawson	4,845	0	0
Cornelius	4,776	0	0
Foad (accepted)	4,539	0	0
Croxford & Co.	3,934	0	0

For sauce factory, Reading, Berks, for Messrs. Charles Cocks & Co. Messrs. Morris & Stallwood, architects. Quantities supplied:—

Rider & Son	£3,590	0	0
Sheppard	3,177	0	0
Woodroffe	3,140	0	0
Pither	3,130	0	0
Reavell	3,111	10	0
Bourton	3,110	0	0
Searle	3,105	0	0
Poffley	3,075	0	0
White	3,068	10	0
Sharpington & Cole	2,963	0	0
Simonds	2,887	0	0
Wheeler, Bros.	2,850	0	0
Gibson	2,695	0	0
Clements (accepted)	2,525	0	0

For village school and residence on the estate of Sir Henry Hawley, bart., at Leybourne. Messrs. Morris & Stallwood, architects:—

Vaughan (accepted)	£938	0	0

For the erection of ten cottages, to form the completion of School-terrace, at Newtown, Reading, for Mr. George Palmer. Messrs. Morris & Stallwood, architects:—

Wicks (accepted)	£1,683	6	0

Accepted for the erection of new stabling and coachman's house at Reading, for Mr. E. May. Messrs. Morris & Smallwood, architects:—

Higgs and Poffley (joint contract)	£856	10	0

For infectious wards at the Royal Berkshire Hospital, Reading. Messrs. Morris & Stallwood, architects. Quantities supplied:—

	Building, exclusive of Plastering.			Plastering, including Polished Parian Walls.		
Filewood	£2,559	0	0	£272	0	0
Sheppard	2,550	0	0	—		
Searle	2,529	0	0	245	0	0
Barnicoat	2,472	0	0	—		
Davis	2,450	0	0	835	0	0
Wheeler, Bros.	2,450	0	0	684	0	0
Poffley	2,355	0	0	—		
Sharpington & Cole	2,343	0	0	197	0	0
Rider & Son	2,338	0	0	420	0	0
Woodbridge	2,200	0	0	1,100	0	0
Simonds	2,200	0	0	486	10	0
Gibson	2,190	0	0	295	0	0

For alterations and additions to Board and National Schools at Erith, Kent. Messrs. Ford & Hesketh, architects:—

Willis	£1,290	3	0
Hills	1,222	14	0
Tongue	1,124	10	0
J. & H. Catchpole	1,081	10	10

For new schools, St. James's R.C. Church, Reading. Messrs. Morris & Stallwood, architects. Quantities supplied:—

Rider & Son	£918	0	0
Woodbridge	875	0	0
Reavell (too late)	850	0	0
Sheppard	838	0	0
Barnicoat	830	0	0
Filewood	827	0	0
Simonds	826	0	0
Gibson	815	0	0
Bourton	813	0	0
Poffley	809	0	0
Wheeler, Bros.	799	0	0
Searle	767	7	0
Pither	734	0	0

For the erection of a dwelling-house and appurtenances, to be known as the Finches, Lindfield, Sussex, for Mr. James Proctor. Mr. T. Laurin, architect:—

Anscombe	£12,555	0	0
Newman & Mann	12,461	0	0
Barnes	12,190	0	0
Walsham & Co.	12,082	0	0
Dove, Bros.	12,008	0	0
Howard	11,974	0	0
Merritt & Ashby	11,967	0	0
Browne & Robinson	11,826	0	0
Chappell	11,783	0	0
Cheesman & Co.	11,678	0	0
Hollands	10,425	0	0
Deacon (accepted)	10,225	0	0

For alterations at the Green Man, Little George-street, Westminster. Messrs. Bird & Walters, architects:—

Hanmar	£874	0	0
Brown	844	0	0
Hockly	825	0	0
Williams & Son	750	0	0
Anley	732	0	0

Gasworks.—The War Department have accepted the tender of Messrs. Chandler & Sons, of York-street and Newington-causeway, for the Government Gasworks extension. The tender of the same firm has also been accepted by the Ystrad Gas Company, for pipe-laying.

TO CORRESPONDENTS.

Erratum.—In account of Bramber Castle, in our last, for "Bognor," as site of Roman remains, read *Bignor*.

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